S/M No. : TCP185MEF0

Service Manual

Colour Television

Chassis : CP-185

Model : DTA - 14C4TFF
DTA - 20C4TF
DTA - 14V1TF
DTA - 21C6TFF

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■ SPECIFICATIONS

Version	TF	TK	TU	TA
TV standard	PAL B/G	PAL-SECAM B/G – D/K	PAL I/I	PAL B/G – SECAM L/L
Sound system	mono			
Power consumption	14 ": 39W; 20 ": 42W; 21 ": 45W.			
Sound Output Power	2.5W (at 60% mod, 10%THD)			
Speaker	3W 8 ohm			
Teletext system	10 pages memory FASTEXT (FLOF or TOP) – version with teletext only			
Aerial input	75 ohm unbalanced			
Channel coverage	Off-air channels, S-cable channels and hyperband			
Tuning system	frequency synthesiser tuning system			
Visual screen size	14 " : 34 cm 20 " : 48 cm 21 " : 51 cm			
Channel indication	On Screen Display			
Program Selection	100 programmes			
Aux. terminal	EURO-SCART : Audio / Video In and Out, R/G/B In, Slow and Fast switching, SVHS In. Audio-Video Jack on front of cabinet in common connection with EURO-SCART. Headphone jack (3.5 mm) on front of cabinet			
Remote Control Unit	R-40A01			

DAEWOO ELECTRONICS CO., LTD.

http : //svc.dwe.co.kr JUN. 2000

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SAFETY INSTRUCTION

WARNING : Only competent service personnel may carry out work involving the testing or repair of this equipment

■ X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The nominal value of the high voltage of this receiver is 22-23 kV (14") or 24-26 kV (20" - 21") at max beam current. The high voltage must not, under any circumstances, exceed 27.5 kV (14", 20"), 29KV (21"). Each time a receiver requires servicing, the high voltage should be checked. It is important to use an accurate and reliable high voltage meter.

2. The only source of X-RAY Radiation in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.

■ SAFETY PRECAUTION

1. Potentials of high voltage are present when this receiver is operating. Operation of the receiver outside the cabinet or with the back cover removed involves a shock hazard from the receiver.
   1)Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.
   2)Discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the Replacement Parts List.
3. When replacing a high wattage resistor (oxide metal film resistor) in circuit board, keep the resistor body 10 mm away from the circuit board.
4. Keep wires away from high voltage or high temperature components.
5. This receiver must operate under AC 230 volts, 5O Hz. NEVER connect to a DC supply of any other voltage or frequency.

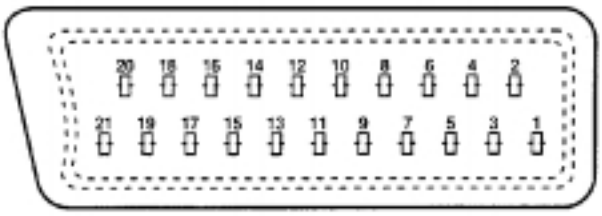
■ PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this equipment have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified by designated symbol on the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitutes replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY Radiation.

SPECIFICATIONS

Pin EURO-SCART :

Pin	Signal Description	Matching value
1	Audio Output Right	0.5 Vrms, Impedance < 1 kW, (RF 54% Mod)
2	Audio Input Right	0.5 Vrms, Impedance > 10 kW
3	Audio Output Left	0.5 Vrms, Impedance < 1 kW, (RF 54% Mod)
4	Audio Earth	
5	Blue Earth	
6	Audio Input Left	0.5 Vrms, Impedance > 10 kW
7	Blue Input	0.7 Vpp ±0.1V, Impedance 75W
8	Slow Switching	TV : 0 to 2V, AV : 4.5 to 12V , Impedance > 10 kW
9	Green Earth	
10	N.C.	
11	Green Input	0.7 Vpp ± 0.1V, Impedance 75W
12	N.C.	
13	Red Earth	
14	Blanking Earth	
15	Red Input Chroma Input	0.7 Vpp ± 0.1V, Impedance 75W ± 3dB for a luminance signal of 1 Vpp
16	Fast Switching	0 to 0.4V : Logic “0”, 1 to 3V : Logic “1”, Impedance 75W
17	Video Out Earth	
18	Video In Earth	
19	Video Output	1 Vpp ± 3dB, Impedance 75W
20	Video Input	1 Vpp ± 3dB, Impedance 75W
21	Common Earth	



Channel table

FREQUENCY TABLE CP185

CH	EUROPE CCIR	FRANCE	GB(IRE-LAND)	EAST OIRT
C01	46.25	-	45.75	49.75
C02	48.25	55.75 (L')	53.75	59.25
C03	55.25	60.5 (L')	61.75	77.25
C04	62.25	63.75 (L')	175.25	85.25
C05	175.25	176.00	183.25	93.25
C06	182.25	184.00	191.25	175.25
C07	189.25	192.00	199.25	183.25
C08	196.25	200.00	207.25	191.25
C09	203.25	208.00	215.25	199.25
C10	210.25	216.00	223.25	207.25
C11	217.25	189.25 (LUX)	231.25	215.25
C12	224.25	69.25 (L')	239.25	223.25
C13	53.75	76.25 (L')	247.25	-
C14	-	83.25 (L')	49.75	-
C15	82.25	90.25	57.75	-
C16	-	97.25	65.75	-
C17	183.75	-	77.75	-
C18	192.25	-	85.75	-
C19	201.25	-	-	-
C20	-	-	-	-
C21	471.25	471.25	471.25	471.25
C22	479.25	479.25	479.25	479.25
C23	487.25	487.25	487.25	487.25
C24	495.25	495.25	495.25	495.25
C25	503.25	503.25	503.25	503.25
C26	511.25	511.25	511.25	511.25
C27	519.25	519.25	519.25	519.25
C28	527.25	527.25	527.25	527.25
C29	535.25	535.25	535.25	535.25
C30	543.25	543.25	543.25	543.25
C31	551.25	551.25	551.25	551.25
C32	559.25	559.25	559.25	559.25
C33	567.25	567.25	567.25	567.25
C34	575.25	575.25	575.25	575.25
C35	583.25	583.25	583.25	583.25
C36	591.25	591.25	591.25	591.25
C37	599.25	599.25	599.25	599.25
C38	607.25	607.25	607.25	607.25
C39	615.25	615.25	615.25	615.25

CH	EUROPE CCIR	FRANCE	GB(IRE-LAND)	EAST OIRT
C40	623.25	623.25	623.25	623.25
C41	631.25	631.25	631.25	631.25
C42	639.25	639.25	639.25	639.25
C43	647.25	647.25	647.25	647.25
C44	655.25	655.25	655.25	655.25
C45	663.25	663.25	663.25	663.25
C46	671.25	671.25	671.25	671.25
C47	679.25	679.25	679.25	679.25
C48	687.25	687.25	687.25	687.25
C49	695.25	695.25	695.25	695.25
C50	703.25	703.25	703.25	703.25
C51	711.25	711.25	711.25	711.25
C52	719.25	719.25	719.25	719.25
C53	727.25	727.25	727.25	727.25
C54	735.25	735.25	735.25	735.25
C55	743.25	743.25	743.25	743.25
C56	751.25	751.25	751.25	751.25
C57	759.25	759.25	759.25	759.25
C58	767.25	767.25	767.25	767.25
C59	775.25	775.25	775.25	775.25
C60	783.25	783.25	783.25	783.25
C61	791.25	791.25	791.25	791.25
C62	799.25	799.25	799.25	799.25
C63	807.25	807.25	807.25	807.25
C64	815.25	815.25	815.25	815.25
C65	823.25	823.25	823.25	823.25
C66	831.25	831.25	831.25	831.25
C67	839.25	839.25	839.25	839.25
C68	847.25	847.25	847.25	847.25
C69	855.25	855.25	855.25	855.25
C70	863.25	863.25	863.25	863.25
C71	69.25	-	-	-
C72	76.25	-	-	-
C73	83.25	-	-	-
C74	90.25	-	-	-
C75	97.25	-	-	-
C76	59.25	-	-	-
C77	93.25	-	-	-
S01	105.25	104.75	103.25	105.25

CH	EUROPE CCIR	FRANCE	GB(IRE-LAND)	EAST OIRT
S02	112.25	116.75	111.25	112.25
S03	119.25	128.75	119.25	119.25
S04	126.25	140.75	127.25	126.25
S05	133.25	152.75	135.25	133.25
S06	140.25	164.75	143.25	140.25
S07	147.25	176.75	151.25	147.25
S08	154.25	188.75	159.25	154.25
S09	161.25	200.75	167.25	161.25
S10	168.25	212.75	-	168.25
S11	231.25	224.75	-	231.25
S12	238.25	236.75	-	238.25
S13	245.25	248.75	255.25	245.25
S14	252.25	260.75	263.25	252.25
S15	259.25	272.75	271.25	259.25
S16	266.25	284.75	279.25	266.25
S17	273.25	296.75	287.25	273.25
S18	280.25	136.00	295.25	280.25
S19	287.25	160.00	303.25	287.25
S20	294.25	-	-	294.25
S21	303.25	303.25	-	303.25

CH	EUROPE CCIR	FRANCE	GB(IRE-LAND)	EAST OIRT
S22	311.25	311.25	311.25	311.25
S23	319.25	319.25	319.25	319.25
S24	327.25	327.25	327.25	327.25
S25	335.25	335.25	335.25	335.25
S26	343.25	343.25	343.25	343.25
S27	351.25	351.25	351.25	351.25
S28	359.25	359.25	359.25	359.25
S29	367.25	367.25	367.25	367.25
S30	375.25	375.25	375.25	375.25
S31	383.25	383.25	383.25	383.25
S32	391.25	391.25	391.25	391.25
S33	399.25	399.25	399.25	399.25
S34	407.25	407.25	407.25	407.25
S35	415.25	415.25	415.25	415.25
S36	423.25	423.25	423.25	423.25
S37	431.25	431.25	431.25	431.25
S38	439.25	439.25	439.25	439.25
S39	447.25	447.25	447.25	447.25
S40	455.25	455.25	455.25	455.25
S41	463.25	463.25	463.25	463.25

ATSS sorting method

The TV set sweeps all the TV bands from beginning of VHF to the end of UHF. The TV controlling software for each program checks if a VPS CNI code is transmitted. If no VPS CNI code is found, the system checks if a CNI code is transmitted in the teletext lines (Packet 8/30 format 1). If such a code (VPS or teletext) is found and if this code is in the ATSS list, the program is automatically named.
The programs found are then sorted into 4 groups :

Group I : Contains all the programs from the selected country and named by the TV controlling software. Within this group the sorting order is fixed by the ATSS list.
Group II : Contains all the programs with a strong signal strength which are not listed in group I.
Group III : Contains all the programs with a weak signal strength which are not listed in group I.
Group IV : If two or more programs with the same code are found, only the strongest (or if they have the same level the one with the lowest frequency) is listed in group I, II or III. The others are listed in group IV.

Note : If two programs with the same name but a different code are found these two programs are listed in group I, II or III (e.g. Regional program SW3 in Germany).

The sorting order within group II, III, and IV is based on the channel frequency. The program with the lowest frequency is allocated the first rank in its group, and so forth until the last program of the group which has the highest frequency.

Program number	Group	Skip
1	Group I	
2		
...		
n		
n+1	Group II	
...		
m		
m+1	Group III	
...		
p		
p+1	Group IV	
...		
q		
q+1	not used	4
...		
99		
0		

Program number	Group	Skip
1		
...	Group II	
m		
m+1		
...	Group III	
p		
p+1		
...	Group IV	
q		
q+1		
...	not used	4
99		
0		

Special case : Country selection = Others

Note

For TV versions without teletext, and if the controlling software is unable to catch the station name, Group I will remain empty.

Special case : France
If France is selected the TV controlling software firstly sweeps all the TV bands with France system selected (positive video modulation) and secondly with Europe system selected (negative video modulation).

Special case : Switzerland
If Switzerland is selected the TV controlling software firstly sweeps all the TV bands with Europe system selected (negative video modulation) and secondly with France system selected (positive video modulation).

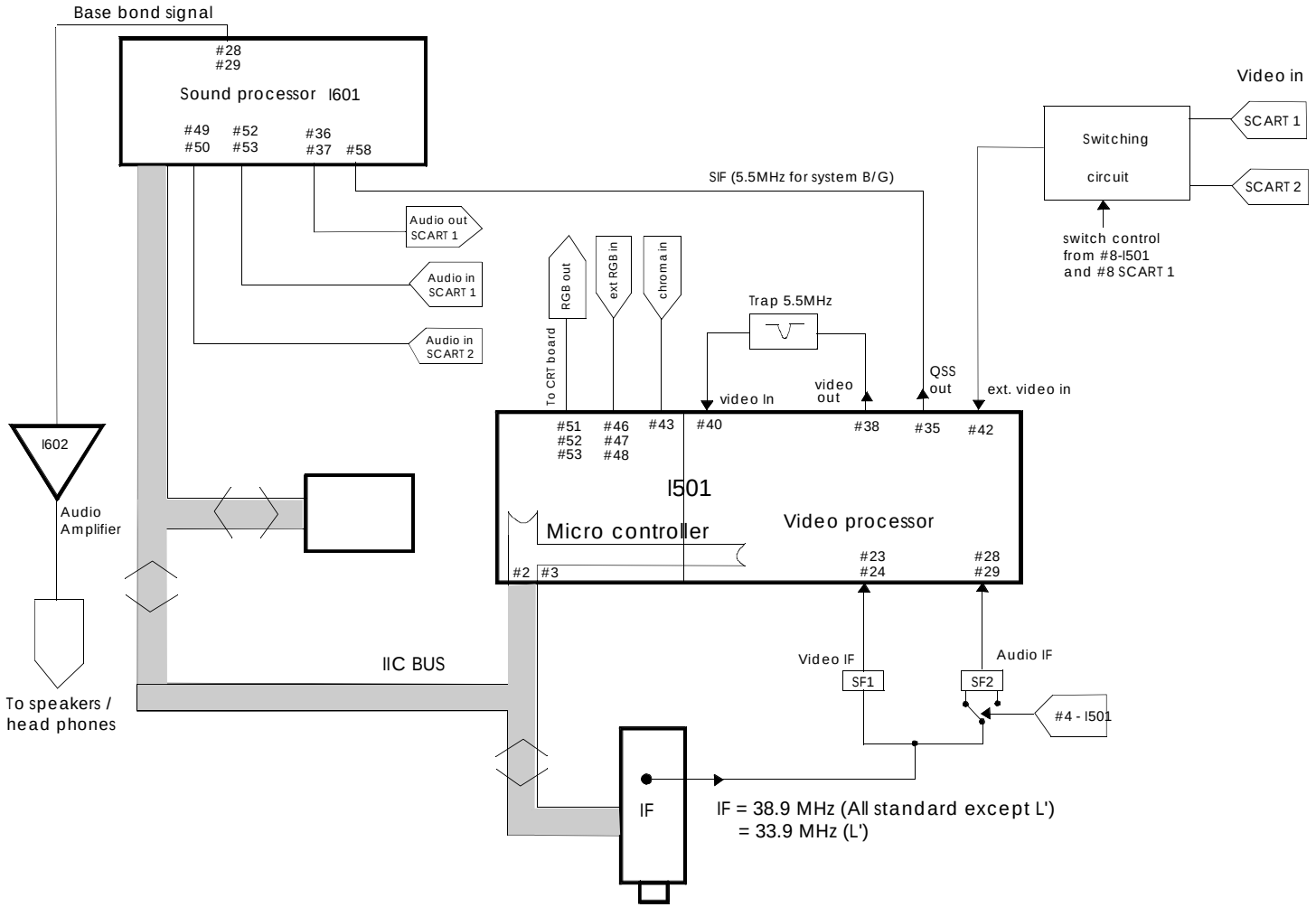
Special case : GB
Note for satellite receiver users : Before starting ATSS turn On your satellite receiver and tune "SKY NEWS ".
If GB is selected the TV controlling software seeks for programs only in UHF (C21 to C70). The sorting order is :
1 - BBC1
2 - BBC2
3 - ITV
4 - CH4
5 - CH5
6 - NEWS

If two or more "identical "programs (same name but different code e.g. BBC1 and BBC1 Scotland) are found the following programs in the list will be shifted up. (1 - BBC1, 2 - BBC1, 3 - BBC2, 4 - ITV, 5 - CH4, 6 - CH5, 7 - NEWS, ..)

If one of the program above is not found, the associated program number remains empty (freq.=467.25 MHz - Skip selected - no name – system = GB).
example A : 1 - BBC1, 2 - BBC2, 3 - ITV, 4 - -----, 5 - CH5, 6 - NEWS, ...
example B (if 2 BBC1 found) : 1 - BBC1, 2 - BBC1, 3 - BBC2, 4 - ITV, 5 - -----, 6 - CH5, 7 - NEWS, ...

Version	TF	TK	TU	TA
ATSS countries	Germany, Belgium, Spain, Italy, Austria, Denmark, Finland, Netherlands, Norway, Sweden, Others	Germany, Belgium, Spain, Italy, Austria, Denmark, Finland, Netherlands, Norway, Sweden, Poland, Hungary, Czech Rep, Others	GB, Ireland, Others	France, Switzerland, Germany, Belgium, Spain, Italy, Austria, Denmark, Finland, Netherlands, Norway, Sweden, Others

CIRCUIT BLOCK DIAGRAM



ALIGNMENT INSTRUCTIONS

Microcontroller configuration : Service mode

To switch the TV set into service mode please see instruction below.

1 - Select pr. number 91
2 - Adjust sharpness to minimum and exit all menu.
3 - Quickly press the key sequence : RED - GREEN - menu

To exit SERVICE menu press menu key or Std By key.

In Service Mode press "OK" to stop the microcontroller i.e. the I2C bus is free and the set can be controlled by external equipment. Press "OK" again to allow the microcontroller to control the set again

Microcontroller configuration :

Tuner Option

Option	Tuner maker
DW	DAEWOO / SAMSUNG
PH1	PHILIPS (Video processor AGC)
PH2	PHILIPS (tuner internal AGC)

System Option

Option	System
TF	PAL – B/G
TK	PAL – SECAM B/G-D/K
TU	PAL I/I
TA	PAL – SECAM B/G-L/L '

TV set Alignment

1 - G2 alignment
- Set TV in NORMAL I mode
- TV in AV mode without video signal ? Black screen.
- TV preset with WP Red, WP Green and WP Blue equal to 32.
- TV preset with Black R, Black G equal to 8.
- Adjust screen volume (on FBT) such that the highest cathode cut-off voltage measured on CRT board, is Vcut-off ± 5V.

Screen size	Vcut-off
14"	115 V
20"& 21"	125 V

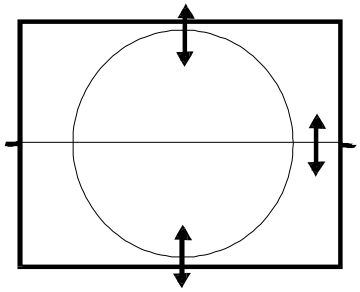
2 - White balance
- Select a dark picture and adjust Black G and Black R to the desired colour temperature.
- Select a bright picture and adjust WP Red, WP Green, WP Blue to the desired colour temperature.

3 - Focus

- Adjust the Focus volume (on FBT) to have the best resolution on screen.

4 - Vertical geometry

- Adjust the Vertical Amplitude, Shift, S-Correction and Slope to compensate for vertical distortion



5 - Horizontal picture centering

- Adjust H Shift to have the picture in the center of the screen.

7 - AGC

- Adjust the antenna signal level to 70 dBμV± 2 for Daewoo tuner (62 dBμV± 2 for Philips tuner).
- Set RF AGC to 0.
- Increase RF AGC level and stop when the level on pin 6 of I501 goes below 2.5 Vdc

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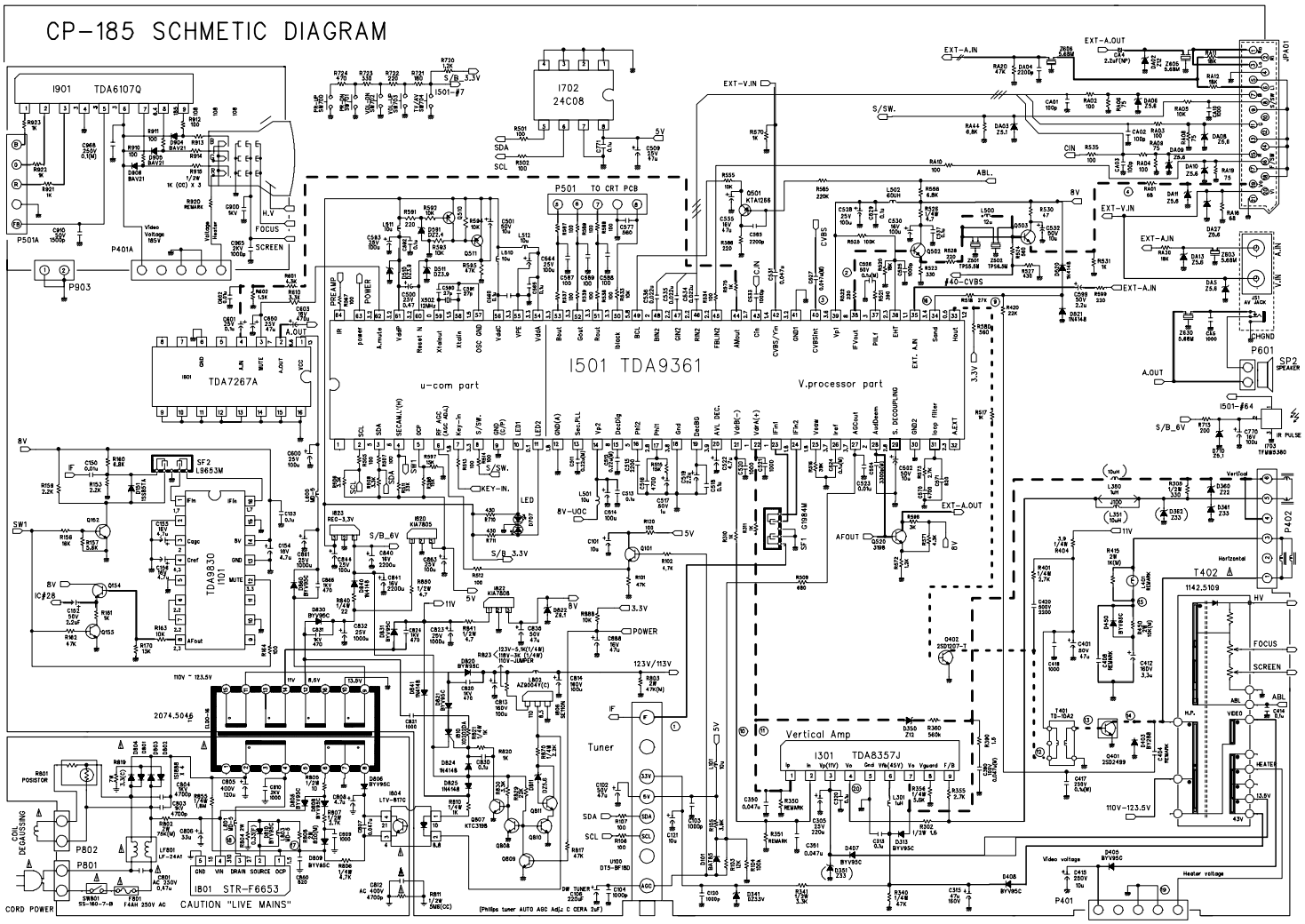
CP-185 SCHMETIC DIAGRAM



NOTE:
1. RESISTANCE IS SHOWN IN OHM. K=1000, M=1000000
2. UNLESS OTHERWISE NOTED IN SCHEMATIC ALL CAPACITOR VALUES ARE EXPRESSED IN uF
3. VOLTAGES READ WITH "VTVM" FROM POINT INDICATED TO CHASSIS GROUND USING A COLOR BAR SIGNAL WITH ALL CONTROLS AT NORMAL LINE 230V AC VOLTAGE READINGS SHOWN ARE NORMAL VALUES AND MAY VARY +20% EXCEPT H.V
4. THIS CIRCUIT DIAGRAM IS A STANDARD ONE CIRCUIT PRINTED MAY BE SUBJECT TO CHANGE FOR PRODUCT IMPROVEMENT WITHOUT PRIOR NOTICE

WARNING:
BEFORE SERVICING THE CHASSIS, READ "X-RAY RADIATION", "SAFETY PRECAUTION", AND "PRODUCT SAFETY NOTICE" IN SERVICE MANUAL

CAUTION TO SERVICE TECHNICIANS:
BEFORE RETURNING THE RECEIVER TO CUSTOMER, LEAKAGE CURRENT OR RESISTANCE MEASUREMENTS SHOULD BE PERFORMED TO DETERMINE THAT EXPOSED PARTS ARE PROPERLY INSULATED FROM THE SUPPLY CIRCUIT.

THE DIFFERENT PARTS FOR CRT

LOC.	21 INCH PHILIPS	21 INCH T/P(DARK)	21 INCH T/P	20 INCH T/P	20 INCH DOSA	14 INCH PHILIPS	14 INCH DOSA
V901	A51EAL16X01	A51EFSB3X191	A51EVB13X08	A48EAX33X01	A48ALLB0X02	A34EAC09X08	A34JLL80X02
SC11	PC5629-03C	⟵	⟵	⟵	PC5633A	⟵	⟵
C454	1.6KV 8200pF	1.6KV 7500pF	1.6KV 7500pF	1.6KV 7500pF	1.6KV 8200pF	1.6KV 7500pF	⟵
D458	200V 0.36 (M)	⟵	200V 0.27 (M)	200V 0.36 (M)	⟵	200V 0.47 (M)	200V 0.3 (M)
L401	L102	L76	TRL3410	L76	⟵	L102	L102
R350	3K(1W)	⟵	1.5K (1W)	1.5K (1W)	⟵	⟵	⟵
R351	3K(1W)	⟵	1.5K (1W)	1.5K (1W)	⟵	⟵	⟵
R556	1/6W 6.8K	1/6W 6.2K	1/6W 6.8K	7.5K	⟵	1/6W 8.2K	1/6W 8.2K
R823	3K	JUMPER	5.1K	3K	JUMPER	3.3K	
R920	1W 2 JA (F)	1W 0.47 JA (F)	1W 1 JA (F)	1W 0.18 (F)	1W 2 JA (F)	1W 0.18 (JA)	1W 1.2 JA (F)

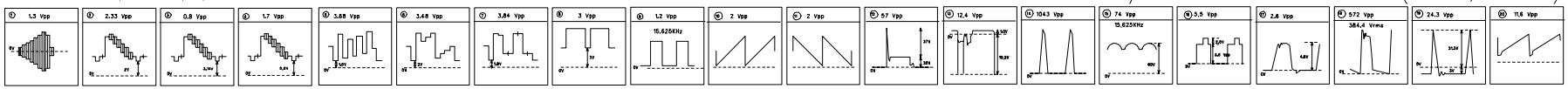
THE DIFFERENT PARTS FOR SYSTEM

LOC.	NAME	TA	TF	TK	TU
SF01	SAW FILTER	D1864M	D1864M	K2996M	J1981M
SF02	SAW FILTER	L9653M	X	X	X
PWC1	POWER CORD AS	CW4232	CW4232	KKP419C	CW3222
Z501	CERA.FILTER	TPS5.5MB	TPS5.5MB	TPS5.5MB	TPS6.0MB
Z502	CERA.FILTER	X	X	TPS6.5MB	X
C801	C LINE ACROSS	AC 250V 0.47u	AC 250V 0.47u	AC 250V 0.1u	AC 250V 0.47u
I101	IC SJF	TDA9830	X	X	X
R153	R.C-FILM	2.2K	X	X	X
R156	R.C-FILM	18K	X	X	X
R157	R.C-FILM	5.6K	X	X	X
R159	R.C-FILM	2.2K	X	X	X
R160	R.C-FILM	6.8K	X	X	X
R161	R.C-FILM	1K	X	X	X
R162	R.C-FILM	47K	X	X	X
R163	R.C-FILM	10K	X	X	X
R164	R.C-FILM	100	X	X	X
Q152	TR	KTC3198	X	X	X
Q154	TR	KTC3198	X	X	X
Q155	TR	KTC3198	X	X	X
D151	DIODE	1SS851A	X	X	X
C158	C. CERA	0.01u	X	X	X
C152	C. ELECTRO	50V 2.2uF	X	X	X
C153	C. CERA	0.1u	X	X	X
C154	C. ELECTRO	16V 4.7u	X	X	X
C155	C. ELECTRO	16V 4.7u	X	X	X
C156	C. ELECTRO	16V 4.7u	X	X	X

PRODUCT SAFETY NOTE :
THE COMPONENTS MARKED WITH ⚠ ARE IMPORTANT FOR MAINTAINING THE SAFETY OF THE SET AND SHOULD BE REPLACED ONLY WITH TYPES IDENTICAL TO THOSE IN THE ORIGINAL OR SPECIFIED ONE IN THE PART LIST. DON'T DEGRADE THE SAFETY OF THE SET THROUGH IMPROPER SERVICING.

* WAVEFORMS

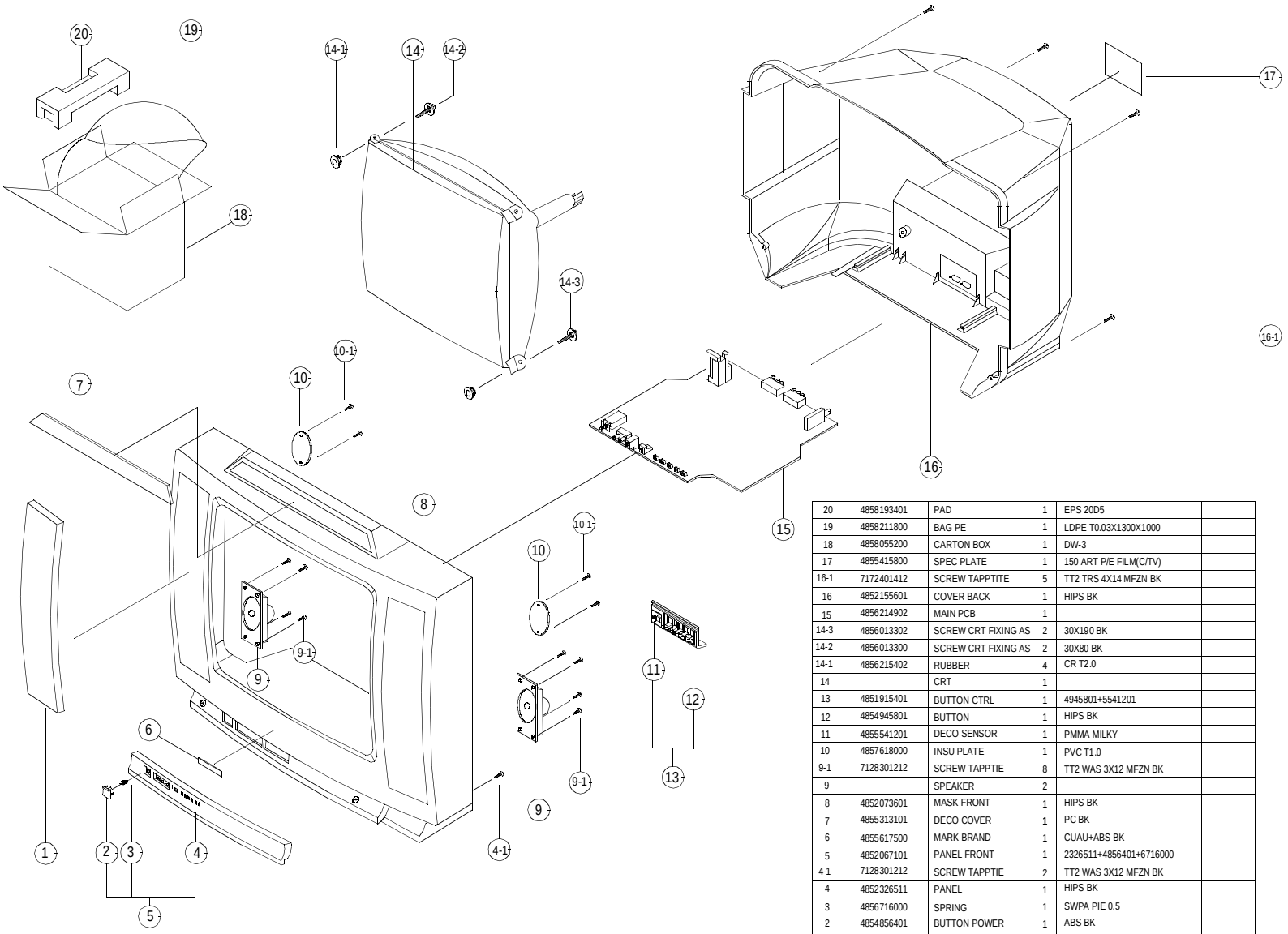
TEST CONDITIONS : PAL-B/G COLOR BAR (NOR.1)



S/N: 4858904593-00 (JUNE, 2000)

AUDIO
VIDEO

EXPLODED VIEW



No	PART CODE	PART NAME	Q'ty	MATERIAL	REMARKS
20	4858193401	PAD	1	EPS 20D5	
19	4858211800	BAG PE	1	LDPE T0.03X1300X1000	
18	4858055200	CARTON BOX	1	DW-3	
17	4855415800	SPEC PLATE	1	150 ART P/E FILM(C/TV)	
16-1	7172401412	SCREW TAPPTITE	5	TT2 TRS 4X14 MFZN BK	
16	4852155601	COVER BACK	1	HIPS BK	
15	4856214902	MAIN PCB	1		
14-3	4856013302	SCREW CRT FIXING AS	2	30X190 BK	
14-2	4856013300	SCREW CRT FIXING AS	2	30X80 BK	
14-1	4856215402	RUBBER	4	CR T2.0	
14		CRT	1		
13	4851915401	BUTTON CTRL	1	4945801+5541201	
12	4854945801	BUTTON	1	HIPS BK	
11	4855541201	DECO SENSOR	1	PMMA MILKY	
10	4857618000	INSU PLATE	1	PVC T1.0	
9-1	7128301212	SCREW TAPPTIE	8	TT2 WAS 3X12 MFZN BK	
9		SPEAKER	2		
8	4852073601	MASK FRONT	1	HIPS BK	
7	4855313101	DECO COVER	1	PC BK	
6	4855617500	MARK BRAND	1	CUAU+ABS BK	
5	4852067101	PANEL FRONT	1	2326511+4856401+6716000	
4-1	7128301212	SCREW TAPPTIE	2	TT2 WAS 3X12 MFZN BK	
4	4852326511	PANEL	1	HIPS BK	
3	4856716000	SPRING	1	SWPA PIE 0.5	
2	4854856401	BUTTON POWER	1	ABS BK	
1	4852539601	GRILL	2	EGI T0.5	

SERVICE PARTS LIST

Caution Ⓡ is a recommendable part for stock.

⚠ is safety component, so it must be used the same component.

LOC.	PART CODE	PART NAME	PART DESCRIPTION
ZZ110	PTACPWA21C6A	ACCESSORY AS	DTA-21C6TAF
00100	4850Q00910P	BATTERY	DAEWOO AAA
M821	4858213800	BAG POLY	L.D.P.E.T0.5X250X40 MILK
ZZ100 Ⓡ	48B3740A01	TRANSMITTER REMOCON	R-40A01
ZZ120	PTBCSHD616	COVER BACK AS	DTP-21C6TFP
M211	4852151601	COVER BACK	HIPS BK 21V1, V4, C6
M541	4855415800	S/PLATE	150ART P/E FILM (C/TV)
M542	4855800022	LABEL SERIAL	ART 90 70X19
ZZ130	PTPKCPA21C6A	PACKING AS	DTA-21C6TAF
10	6520010200	STAPLE PIN	#3417 ALL
20	6520010200	STAPLE PIN	#3417 ALL
M811	4858190700	PAD	EPS 21C6
M821	4858211801	BAG P.E.	PE FILM T0.05X1300X1000
ZZ140	PTCACAA21C6AF	CABINET AS	DTA-21C6TAF
M191	4854943202	BUTTON CONTROL	21C6
M201A	4856013301	SCREW CRT FIXING AS	L-140
M201B	4856215402	WASHER RUBBER	20"
M201C	4856013303	SCREW CRT FIXING AS	L-240
M211A	7172401412	SCREW TAPPING	TT2 TRS 4X14 MFZN BK
M211D	7172401412	SCREW TAPPING	TT2 TRS 4X14 MFZN BK
M481	4854943203	BUTTON POWER	ABS BK 21C6
M551	4855538000	DECO SENSOR	21C6
M561	485562140101	MARK BRAND	DAEWOO 14/20/21/C4/C6
M681	4856812001	TIE CABLE	NYLON66 DA100
P402A	4850706N06	CONN AS	35135-0620+35719+ULW=550
PWC1	4859906210	CORD POWER	FTZ (LOMAX NEW TYPE)
SP01A	7178301011	SCREW TAPPING	TT2 WAS 3X10 MFZN
V901 Ⓡ⚠	4859607660C	CRT (PHILIPS 21")	A51EAL155X17 (CONN AS)
ZZ131 ⚠	58G0000074	COIL DEGAUSSING	21" DC-2070
ZZ132	48519A5310	CRT GROUND AS	2101S-1015-1P
ZZ200Ⓡ	PTFMSJD616	MASK FRONT AS	DTP-21C6TFP
M201	4852071401	MASK FRONT	HIPS BK 21C6
ZZ210	PTSPPWA615	SPEAKER AS	DTP-14C4TFD
P601A	4850703S50	CONN AS	YH025-03+3509=200
SP01 Ⓡ	4858314010	SPEAKER	SP-5070F01 3W 8 OHM
ZZ290	PTMPMSA21C6AF	PCB MAIN MANUAL AS	DTA-21C6TAF
10	2193100801	SOLDER BAR	SN:PB=63:37 3PI(NO FLUX)
40	2291050314	FLUX SOLVENT	IM-1000
20	2193011101	SOLDER WIRE	RS 60-1.2 1.6A
30	2291050617P	FLUX SOLDER	CF-329D
50	2291140501	WAX COVER	60G/PC
60	2291051001	FLUX KILLER	KFT-7
C315	CEXF2C470C	C ELECTRO	160V RUS 47MF (13X25) TP
C404	CMYT3C822J	C MYLAR	1.6KV 8200PF MKP
C408	CMYE2D364J	C MYLAR	200V 0.36MF J (PL)

LOC.	PART CODE	PART NAME	PART DESCRIPTION
C415	CEXF2E100V	C ELECTRO	250V RSS 10MF (10X20) TP
C603	CEXF1C471V	C ELECTRO	16V RSS 470MF (10X12.5)TP
C801 ⚠	CL1SC3474M	C LINE ACROSS	275V 0.47MF
C805 Ⓡ	CEYN2G121P	C ELECTRO	400V LHS 120MF
C810	CCXB3D102K	C CERA	2KV B 1000 PF K (TAPPING)
C812 Ⓡ⚠	CH1AFE472M	C CERA AC	4KV 4700PF M KX DE1610
C813	CEXF2C101V	C ELECTRO	160V RSS 100MF (16X25) TP
C814	CEXF2C101V	C ELECTRO	160V RSS 100MF (16X25) TP
C820	CCXB3A471K	C CERA	1KV B 470PF K (T)
C823	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP
C824	CCXB3A471K	C CERA	1KV B 470PF K (T)
C831	CCXB3A471K	C CERA	1KV B 470PF K (T)
C832	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP
C840	CEXF1C222V	C ELECTRO	16V RSS 2200MF(13X25)TP
C841	CEXF1C222V	C ELECTRO	16V RSS 2200MF(13X25)TP
C861	CEXF1E102V	C ELECTRO	25V RSS 1000MF (13X20) TP
C866	CCXB3A471K	C CERA	1KV B 470PF K (T)
C965	CCXB3D102K	C CERA	2KV B 1000 PF K (TAPPING)
D403	DBY228----	DIODE	BY228
D707	DSML1216W-	LED	SML1216W
D820	DBYW76----	DIODE	BYW76
F801 ⚠	5FSCB4022R	FUSE CERA	SEMKO F4AH 4A 250V MF51
G900	4SG0D00103	SPARK GAP	S-23 900V-1.5KV
I101	1TDA9830--	IC RF	TDA9830
I301 Ⓡ	1TDA8357J-	IC VERTICAL	TDA8357J
I301A	4857025405	HEAT SINK	A1050P-H24 (CP-185)
I301B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN
I501 Ⓡ	1TDA9361--	IC MAIN	TDA9361PS/N1/3
I601 Ⓡ	1TDA7267A-	IC AMP	TDA7267A
I702	1AT24C08PC	IC MEMORY	AT24C08-10PC
I703	1KRT30----	IC PREAMP	KRT30
I801 Ⓡ	1STRF6653-	IC SMPS	STR-F6653
I801A	4857024618	HEAT SINK	I801A (CP-385 AIWA)
I801B	7174300811	SCREW TAPPTITE	TT2 RND 3X8 MFZN
I804 ⚠	1LTV817C--	IC PHOTO COUPLER	LTV-817C
I806	1SE110N---	IC	SE110N
I810	TX0202DA--	THYRISTOR	X0202DA
I820	1KA7805---	IC REGULATOR	KA7805
I822	1KA7808---	IC REGULATOR	KA7808
I823	1LE33CZ---	IC REGULATOR	LE33CZ
I901	1TDA6107Q-	IC VIDEO	TDA6107Q
I901A	4857031100	HEAT SINK	A1050P-H24 T2.0
I901B	7174301011	SCREW TAPPTITE	TT2 RND 3X10 MFZN
JPA1	4859200401	SOCKET RGB	SR-21A1 (ANGLE TYPE)
JS1	4859109950	JACK PIN BOARD	PH-JB-9710A
L401	58H0000016	COIL H-LINEARITY	L-102 (102UH)
L802	58C9430599	COIL CHOKE	AZ-9004Y(94MH)
LF801	5PLF24A1--	FILTER LINE	LF-24A1
M351	4853533600	HOLDER LED	P.P BK

LOC.	PART CODE	PART NAME	PART DESCRIPTION
M791	4857913304	RUBBER CUSION	FR RUBBER SPONGE
P401	4850705N18	CONN AS	BIC-05T-25T+ULW=400
P402	4859240120	CONN WAFER	YFW500-06
P501	4850705N14	CONNECTOR	BIC-05T-25T+ULW=500
P601	4859231620	CONN WAFER	YW025-03
P801	4859287320	CONN WAFER	MKS2822 (LOMAX NEW TYPE)
P802	4859242220	CONN WAFER	YFW800-02
Q401 Ⓡ	T2SD2499--	TR	2SD2499
R305	RS02Y331JS	R M-OXIDE FILM	2W 330 OHM J SMALL
R415	RS02Y102JS	R M-OXIDE FILM	2W 1K OHM J SMALL
R450	RS02Y103JS	R M-OXIDE FILM	2W 10K OHM J SMALL
R801	DT120B8010	POSISTOR	T120-B80-A110
R802	RS02Y753JS	R M-OXIDE FILM	2W 75K OHM J SMALL
R803	RS02Y473JS	R M-OXIDE FILM	2W 47K OHM J SMALL
R804	RF02Y338K-	R FUSIBLE	2W 0.33 OHM K
R808	RS02Y821JS	R M-OXIDE FILM	2W 820 OHM J SMALL
R819	RX07C339JF	R CEMENT	7W 3.3 OHM J 15MM 4P
R920	RF01Y209JA	R FUSIBLE	1W 2 OHM J A CURVE
SCT1 ⚠	4859303530	SOCKET CRT	PCS629-03C
SF1	5PG1984M--	FILTER SAW	G1984M
SF2	5PL9653M--	FILTER SAW	L9653M
SW801Ⓡ	5S40101146	SW POWER PUSH	SS-160-7-B
T401 Ⓡ	50D10A2---	TRANS DRIVE	TD-10A2
T402 Ⓡ⚠	50H0000211	FBT	1142.5109
T801 ⚠	20745046--	TRANS SMPS	2074.5046
U100 Ⓡ	4859720730	TUNER VARACTOR	UV1316/A
X502	5XE12R000E	CRYSTAL QUARTZ	HC-49/U 12.00000MHZ 30PPM
Z501	5PXPS5R5MB	FILTER CERA	TPS5.5MB-TF21 TAPING
ZZ200	PTMPJRA21C6AF	PCB MAIN RADIAL AS	DTA-21C6TAF
C101	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C102	CEXF1H470V	C ELECTRO	50V RSS 47MF (6.3*11) TP
C106	CEXF1E221V	C ELECTRO	25V RSS 220MF (8X11.5) TP
C120	CCXB1H102K	C CERA	50V B 1000PF K (TAPPING)
C121	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C152	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP
C153	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)
C154	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5*11) TP
C155	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5*11) TP
C156	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5*11) TP
C305	CEXF1E221V	C ELECTRO	25V RSS 220MF (8X11.5) TP
C313	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)
C320	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)
C390	CMXM2A473J	C MYLAR	100V 0.047MF J TP
C401	CEXF1H470V	C ELECTRO	50V RSS 47MF (6.3*11) TP
C412	CEXF2C339V	C ELECTRO	160V RSS 3.3MF (8X16) TP
C414	CMXM2A104J	C MYLAR	100V 0.1MF J TP
C417	CMXL2E104K	C MYLAR	250V 0.1MF K MEU TP
C418	CCXB1H102K	C CERA	50V B 1000PF K (TAPPING)
C420	CCXB2H222K	C CERA	500V B 2200PF K (TAPPING)

LOC.	PART CODE	PART NAME	PART DESCRIPTION
C500	CEXF1H478V	C ELECTRO	50V RSS 0.47MF (5X11) TP
C501	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C502	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C504	CMXM2A332J	C MYLAR	100V 3300PF J TP
C509	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP
C511	CMXB1H224J	C MYLAR	50V EU 0.22MF J(TP)
C512	CMXB1H224J	C MYLAR	50V EU 0.22MF J(TP)
C513	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)
C514	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C517	CEXF1H109V	C ELECTRO	50V RSS 1MF (5X11) TP
C519	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP
C522	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5*11) TP
C524	CMXB1H104J	C MYLAR	50V EU 0.1MF J (TP)
C525	CCXB1H102K	C CERA	50V B 1000PF K (TAPPING)
C526	CMXB1H104J	C MYLAR	50V EU 0.1MF J (TP)
C527	CMXM2A473J	C MYLAR	100V 0.047MF J TP
C528	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C530	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP
C532	CEXF1H100V	C ELECTRO	50V RSS 10MF (5X11) TP
C533	CCXB1H102K	C CERA	50V B 1000PF K (TAPPING)
C537	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)
C555	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C560	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)
C564	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C565	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)
C570	CCXB1H472K	C CERA	50V B 4700PF K (TAPPING)
C571	CCXB1H821K	C CERA	50V B 820PF K (TAPPING)
C585	CCXB1H222K	C CERA	50V B 2200PF K (TAPPING)
C590	CXCH1H270J	C CERA	50V CH 27PF J (TAPPING)
C591	CXCH1H270J	C CERA	50V CH 27PF J (TAPPING)
C592	CBXF1H104Z	C CERA SEMI	50V F 0.1MF Z (TAPPING)
C593	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C599	CEXF1H229V	C ELECTRO	50V RSS 2.2MF (5X11) TP
C600	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C601	CEXF1H108V	C ELECTRO	50V RSS 0.1MF (5X11) TP
C602	CCXF1H103Z	C CERA	50V F 0.01MF Z (TAPPING)
C650	CEXF1E470V	C ELECTRO	25V RSS 47MF (5X11) TP
C770	CEXF1C101V	C ELECTRO	16V RSS 100MF (6.3X11) TP
C803	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)
C804	CCXF3A472Z	C CERA	1KV F 4700PF Z (T)
C806	CEXF1H330V	C ELECTRO	50V RSS 33MF (6.3X11) TP
C807	CCXF1H473Z	C CERA	50V F 0.047MF Z (TAPPING)
C808	CEXF1H479V	C ELECTRO	50V RSS 4.7MF (5*11) TP
C821	CCXB1H102K	C CERA	50V B 1000PF K (TAPPING)
C835	CEXF1H470V	C ELECTRO	50V RSS 47MF (6.3*11) TP
C844	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C863	CEXF1E101V	C ELECTRO	25V RSS 100MF (6.3X11) TP
C888	CEXF1C470V	C ELECTRO	16V RSS 47MF (5X11) TP
C910	CCXB1H152K	C CERA	50V B 1500PF K (TAPPING)

LOC.	PART CODE	PART NAME	PART DESCRIPTION
C968	CMXL2E104K	C MYLAR	250V 0.1MF K MEU TP
CA04	CEXD1H229F	C ELECTRO	50V RND 2.2MF (5X11) TP
CA05	CCXB1H102K	C CERA	50V B 1000PF K (TAPPING)
F801A	4857415001	CLIP FUSE	PFC5000-0702
F801B	4857415001	CLIP FUSE	PFC5000-0702
Q101	T2SC5343Y-	TR	2SC5343Y
Q152	T2SC5343Y-	TR	2SC5343Y
Q154	T2SC5343Y-	TR	2SC5343Y
Q155	T2SC5343Y-	TR	2SC5343Y
Q402	T2SD1207T-	TR	2SD1207-T (TAPPING)
Q501	TSTA933Y--	TR	STA933-Y
Q502	T2SC5343Y-	TR	2SC5343Y
Q503	T2SC5343Y-	TR	2SC5343Y
Q510	TSTA933Y--	TR	STA933-Y
Q511	TSTA933Y--	TR	STA933-Y
Q520	T2SC5343Y-	TR	2SC5343Y
Q807	T2SC5343Y-	TR	2SC5343Y
Q808	T2SC5343Y-	TR	2SC5343Y
Q809	T2SC5343Y-	TR	2SC5343Y
Q810	T2SC5343Y-	TR	2SC5343Y
Q811	T2SC5343Y-	TR	2SC5343Y
SW700	5S50101090	SW TACT	SKHV17910A
SW701	5S50101090	SW TACT	SKHV17910A
SW702	5S50101090	SW TACT	SKHV17910A
SW703	5S50101090	SW TACT	SKHV17910A
SW704	5S50101090	SW TACT	SKHV17910A
Z603	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
Z605	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
Z606	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
Z630	5PXF1B471M	FILTER EMI	CFI 06 B 1H 470PF
ZZ200	PTMPJAA21C6AF	PCB MAIN AXIAL AS	DTA-21C6TAF
10	2TM10006LB	TAPE MASKING	3M #232-MAP-C 6.2X2000M
20	2TM14006LB	TAPE MASKING	3M #232 6.0X2000M
A001	4859804593	PCB MAIN	246X246 CP-185
C103	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)
C104	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)
C150	CCZF1H103Z	C CERA	50V F 0.01MF Z
C350	CCZF1H473Z	C CERA	50V F 0.047MF Z AXIAL
C351	CCZF1H473Z	C CERA	50V F 0.047MF Z AXIAL
C515	CBZR1C222M	C CERA	Y5R 16V 2200PF M AXIAL
C516	CCZB1H472K	C CERA	50V B 4700PF K (AXIAL)
C518	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)
C520	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)
C521	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)
C523	CCZF1H103Z	C CERA	50V F 0.01MF Z
C529	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)
C531	CCZF1H473Z	C CERA	50V F 0.047MF Z AXIAL
C534	CCZF1H223Z	C CERA	50V F 0.022MF Z
C535	CCZF1H223Z	C CERA	50V F 0.022MF Z

LOC.	PART CODE	PART NAME	PART DESCRIPTION
C536	CCZF1H223Z	C CERA	50V F 0.022MF Z
C577	CCZB1H561K	C CERA	50V B 560PF K (AXIAL)
C587	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)
C588	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)
C589	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)
C771	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)
C809	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)
C830	CBZF1H104Z	C CERA SEMI	50V F 0.1MF Z (AXIAL)
C850	CCZB1H821K	C CERA	50V B 820PF K (AXIAL)
CA01	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)
CA02	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)
CA03	CCZB1H101K	C CERA	50V B 100PF K (AXIAL)
CA10	CCZB1H102K	C CERA	50V B 1000PF K (AXIAL)
D101	DBAT85----	DIODE	BAT85 (TAPPING)
D151	D1SS85TA--	DIODE	1SS85TA
D313	DBYW36----	DIODE	BYW36 (TAPPING)
D341	DUZ33B----	DIODE ZENER	UZ-33B
D350	DTZX12C---	DIODE ZENER	TZX12C (TAPPING)
D360	DTZX22C---	DIODE ZENER	TZX22C (TAPPING)
D361	DUZ33B----	DIODE ZENER	UZ-33B
D405	DBYW36----	DIODE	BYW36 (TAPPING)
D407	DBYW36----	DIODE	BYW36 (TAPPING)
D408	DBYW36----	DIODE	BYW36 (TAPPING)
D450	DBYW36----	DIODE	BYW36 (TAPPING)
D510	DUZ3R9B---	DIODE ZENER	UZ-3.9B
D511	DUZ3R9B---	DIODE ZENER	UZ-3.9B
D520	D1N4148---	DIODE	1N4148 (TAPPING)
D521	D1N4148---	DIODE	1N4148 (TAPPING)
D591	DTZX2V4A--	DIODE ZENER	TZX2V4A
D710	DTZX5V1B--	DIODE ZENER	TZX5V1B (TAPPING)
D801	DBYT51J---	DIODE	BYT51J (TAPPING)
D802	DBYT51J---	DIODE	BYT51J (TAPPING)
D803	DBYT51J---	DIODE	BYT51J (TAPPING)
D804	DBYT51J---	DIODE	BYT51J (TAPPING)
D805	DBYW36----	DIODE	BYW36 (TAPPING)
D806	DBYW36----	DIODE	BYW36 (TAPPING)
D808	DBYW36----	DIODE	BYW36 (TAPPING)
D809	DBYW36----	DIODE	BYW36 (TAPPING)
D810	DBYW36----	DIODE	BYW36 (TAPPING)
D811	DTZX5V6B--	DIODE ZENER	TZX5V6B (TAPPING)
D821	DBYW36----	DIODE	BYW36 (TAPPING)
D822	DTZX9V1B--	DIODE ZENER	TZX9V1B (TAPPING)
D824	D1N4148---	DIODE	1N4148 (TAPPING)
D825	D1N4148---	DIODE	1N4148 (TAPPING)
D830	DBYW36----	DIODE	BYW36 (TAPPING)
D831	DBYW36----	DIODE	BYW36 (TAPPING)
D840	D1N4148---	DIODE	1N4148 (TAPPING)
D841	D1N4148---	DIODE	1N4148 (TAPPING)
D860	DBYW36----	DIODE	BYW36 (TAPPING)

LOC.	PART CODE	PART NAME	PART DESCRIPTION
D904	DBAV21----	DIODE	BAV21 (TAPPING)
D905	DBAV21----	DIODE	BAV21 (TAPPING)
D906	DBAV21----	DIODE	BAV21 (TAPPING)
DA02	DTZX12C---	DIODE ZENER	TZX12C (TAPPING)
DA03	DTZX5V1B--	DIODE ZENER	TZX5V1B (TAPPING)
DA04	CBZR1C222M	C CERA	Y5R 16V 2200PF M AXIAL
DA05	DTZX5V6B--	DIODE ZENER	TZX5V6B (TAPPING)
DA06	DTZX5V6B--	DIODE ZENER	TZX5V6B (TAPPING)
DA08	DTZX5V6B--	DIODE ZENER	TZX5V6B (TAPPING)
DA09	DTZX5V6B--	DIODE ZENER	TZX5V6B (TAPPING)
DA10	DTZX5V6B--	DIODE ZENER	TZX5V6B (TAPPING)
DA11	DTZX5V6B--	DIODE ZENER	TZX5V6B (TAPPING)
DA27	DTZX5V6B--	DIODE ZENER	TZX5V6B (TAPPING)
JAMP WIRES	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING
L101	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)
L301	5CPZ109M04	COIL PEAKING	1UH 10.5MM M (LAL04TB)
L350	5CPZ109M04	COIL PEAKING	1UH 10.5MM M (LAL04TB)
L351	85801065GY	WIRE COPPER	AWG22 1/0.65 TIN COATING
L500	5CPZ120K02	COIL PEAKING	12UH 3.5MM K (LAL02TB)
L501	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)
L502	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)
L510	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)
L511	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)
L512	5CPZ100K02	COIL PEAKING	10UH 3.5MM K (LAL02TB)
L600	5MC0000100	COIL BEAD	MD-5 (HC-3550)
L801	5MC0000100	COIL BEAD	MD-5 (HC-3550)
L803	5MC0000100	COIL BEAD	MD-5 (HC-3550)
R101	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J
R102	RD-AZ472J-	R CARBON FILM	1/6 4.7K OHM J
R103	RD-AZ123J-	R CARBON FILM	1/6 12K OHM J
R104	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J
R105	RD-AZ392J-	R CARBON FILM	1/6 3.9K OHM J
R106	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R107	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R120	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R153	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J
R156	RD-AZ163J-	R CARBON FILM	1/6 16K OHM J
R157	RD-AZ562J-	R CARBON FILM	1/6 5.6K OHM J
R159	RD-AZ222J-	R CARBON FILM	1/6 2.2K OHM J
R160	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J
R161	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R162	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J
R163	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R164	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R170	RD-AZ133J-	R CARBON FILM	1/6 13K OHM J
R302	RD-2Z159J-	R CARBON FILM	1/2 1.5 OHM J
R310	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R311	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J

LOC.	PART CODE	PART NAME	PART DESCRIPTION
R340	RD-4Z473J-	R CARBON FILM	1/4 47K OHM J
R341	RD-2Z332J-	R CARBON FILM	1/2 3.3K OHM J
R350	RN-4Z2001F	R METAL FILM	1/4 2.0K OHM F
R351	RN-4Z2001F	R METAL FILM	1/4 2.0K OHM F
R355	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J
R356	RD-4Z562J-	R CARBON FILM	1/4 5.6K OHM J
R360	RD-4Z564J-	R CARBON FILM	1/4 560K OHM J
R390	RD-4Z159J-	R CARBON FILM	1/4 1.5 OHM J
R401	RD-4Z272J-	R CARBON FILM	1/4 2.7K OHM J
R404	RD-4Z399J-	R CARBON FILM	1/4 3.9 OHM J
R420	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J
R501	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R502	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R505	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R506	RD-AZ332J-	R CARBON FILM	1/6 3.3K OHM J
R507	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R508	RD-AZ332J-	R CARBON FILM	1/6 3.3K OHM J
R509	RD-AZ681J-	R CARBON FILM	1/6 680 OHM J
R511	RD-AZ333J-	R CARBON FILM	1/6 33K OHM J
R512	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R513	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R514	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R515	RD-AZ153J-	R CARBON FILM	1/6 15K OHM J
R516	RD-AZ393J-	R CARBON FILM	1/6 39K OHM J
R517	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R518	RD-AZ273J-	R CARBON FILM	1/6 27K OHM J
R520	RD-AZ183J-	R CARBON FILM	1/6 18K OHM J
R521	RD-AZ391J-	R CARBON FILM	1/6 390 OHM J
R522	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J
R523	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J
R524	RD-AZ561J-	R CARBON FILM	1/6 560 OHM J
R525	RD-AZ104J-	R CARBON FILM	1/6 100K OHM J
R526	RD-4Z479J-	R CARBON FILM	1/4 4.7 OHM J
R527	RD-AZ431J-	R CARBON FILM	1/6 430 OHM J
R528	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J
R530	RD-AZ470J-	R CARBON FILM	1/6 47 OHM J
R531	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R533	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R534	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R535	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R537	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R538	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R539	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R555	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R556	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J
R567	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R570	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J
R571	RD-AZ432J-	R CARBON FILM	1/6 4.3K OHM J
R572	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J

LOC.	PART CODE	PART NAME	PART DESCRIPTION
R573	RD-AZ272J-	R CARBON FILM	1/6 2.7K OHM J
R575	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R580	RD-AZ561J-	R CARBON FILM	1/6 560 OHM J
R585	RD-AZ224J-	R CARBON FILM	1/6 220K OHM J
R586	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J
R587	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R588	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R589	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R591	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J
R592	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R593	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R594	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R595	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J
R596	RD-AZ302J-	R CARBON FILM	1/6 3K OHM J
R597	RD-AZ153J-	R CARBON FILM	1/6 15K OHM J
R598	RD-AZ153J-	R CARBON FILM	1/6 15K OHM J
R599	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J
R601	RD-4Z432J-	R CARBON FILM	1/4 4.3K OHM J
R602	RD-AZ152J-	R CARBON FILM	1/6 1.5K OHM J
R610	RD-AZ332J-	R CARBON FILM	1/6 3.3K OHM J
R710	RD-AZ431J-	R CARBON FILM	1/6 430 OHM J
R711	RD-AZ431J-	R CARBON FILM	1/6 430 OHM J
R713	RD-AZ681J-	R CARBON FILM	1/6 680 OHM J
R720	RD-AZ122J-	R CARBON FILM	1/6 1.2K OHM J
R721	RD-AZ181J-	R CARBON FILM	1/6 180 OHM J
R722	RD-AZ221J-	R CARBON FILM	1/6 220 OHM J
R723	RD-AZ331J-	R CARBON FILM	1/6 330 OHM J
R724	RD-AZ471J-	R CARBON FILM	1/6 470 OHM J
R805	RD-2Z100J-	R CARBON FILM	1/2 10 OHM J
R806	RD-4Z472J-	R CARBON FILM	1/4 4.7K OHM J
R807	RD-2Z272J-	R CARBON FILM	1/2 2.7K OHM J
R810	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J
R811 ⚠	RC-2Z565KP	R CARBON COMP	1/2 5.6M OHM K
R817	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J
R820	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R821	RD-4Z102J-	R CARBON FILM	1/4 1K OHM J
R823	RD-4Z302J-	R CARBON FILM	1/4 3K OHM J
R829	RD-AZ223J-	R CARBON FILM	1/6 22K OHM J
R830	RD-AZ332J-	R CARBON FILM	1/6 3.3K OHM J
R840	RD-4Z220J-	R CARBON FILM	1/4 22 OHM J
R841	RD-2Z479J-	R CARBON FILM	1/2 4.7 OHM J
R850	RD-2Z479J-	R CARBON FILM	1/2 4.7 OHM J
R855	RD-4Z185J-	R CARBON FILM	1/4 1.8M OHM J
R870	RD-4Z222J-	R CARBON FILM	1/4 2.2K OHM J
R888	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
R910	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R911	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R912	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
R913	RC-2Z102K-	R CARBON COMP	1/2 1K OHM K

LOC.	PART CODE	PART NAME	PART DESCRIPTION
R914	RC-2Z102K-	R CARBON COMP	1/2 1K OHM K
R915	RC-2Z102K-	R CARBON COMP	1/2 1K OHM K
R921	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R922	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
R923	RD-AZ102J-	R CARBON FILM	1/6 1K OHM J
RA01	RD-AZ680J-	R CARBON FILM	1/6 68 OHM J
RA02	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
RA03	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
RA04	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
RA05	RD-AZ103J-	R CARBON FILM	1/6 10K OHM J
RA06	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J
RA08	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J
RA09	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J
RA10	RD-AZ101J-	R CARBON FILM	1/6 100 OHM J
RA11	RD-AZ183J-	R CARBON FILM	1/6 18K OHM J
RA12	RD-AZ183J-	R CARBON FILM	1/6 18K OHM J
RA16	RD-AZ680J-	R CARBON FILM	1/6 68 OHM J
RA19	RD-AZ750J-	R CARBON FILM	1/6 75 OHM J
RA20	RD-AZ473J-	R CARBON FILM	1/6 47K OHM J
RA30	RD-AZ183J-	R CARBON FILM	1/6 18K OHM J
RA44	RD-AZ682J-	R CARBON FILM	1/6 6.8K OHM J

■ THE DIFFERENT PARTS FOR SYSTEM (CP-185)

LOC.	NAME	TA	TF	TK	TU
SF01	SAW FILTER	G1984M	G1984M	K2960M	J1981M
SFO2	SAW FILTER	L9653M	X	X	X
PWC1	POWER CORD AS	CW4232	CW4232	KKP419C	CW3222
Z501	CERA FILTER	TPS5.5MB	TPS5.5MB	TPS5.5MB	TPS6.0MB
Z502	CERA FILTER	TPS6.5MB	X	X	X
C801	C LINE ACROSS	AC 250V 0.47u	AC 250V 0.47u	AC 250V 0.47u	AC 250V 0.47u
I101	IC IF	TDA9830	X	X	X
R153	R.C.-FILM	2.2K	X	X	X
R156	R.C.-FILM	16K	X	X	X
R157	R.C.-FILM	5.6K	X	X	X
R159	R.C.-FILM	2.2K	X	X	X
R160	R.C.-FILM	6.8K	X	X	X
R161	R.C.-FILM	1K	X	X	X
R162	R.C.-FILM	47K	X	X	X
R163	R.C.-FILM	10K	X	X	X
R164	R.C.-FILM	100	X	X	X
Q152	TR	KTC3198	X	X	X
Q154	TR	KTC3198	X	X	X
Q155	TR	KTC3198	X	X	X
D151	DIODE	1SS85TA	X	X	X
C150	C. CERA	0.01u	X	X	X
C152	C. ELECTRO	50V 2.2uF	X	X	X
C153	C. CERA	0.1u	X	X	X
C154	C. ELECTRO	16V 4.7u	X	X	X
C155	C. ELECTRO	16V 4.7u	X	X	X
C156	C. ELECTRO	16V 4.7u	X	X	X

■ THE DIFFERENT PARTS FOR CRT (CP-185)

LOC.	21" PHILIPS	21" T/P (DARK)	21" T/P	20" T/P
V901	A51EAL155X01	A51EFS83X191	A51EVB13X09	A48EAX33X01
	4859607660	4859629360C	4859621760C	4859611260N
SCT1	PCS629-03C	PCS629-03C	PCS629-03C	PCS629-03C
	4859303530	4859303530	4859303530	4859303530
C404	1.6KV 8200pF	1.6KV 7500pF	1.6KV 7500pF	1.6KV 7500pF
	CMYT3C822J	CMYT3C752J	CMYT3C752J	CMYT3C752J
C408	200V 0.36 (M)	200V 0.36 (M)	200V 0.27 (M)	200V 0.36 (M)
	CMYT2D364J	CMYT2D364J	CMYT2D274J	CMYT2D364J
L401	L102	L76	TRL341G	L76
	58H0000016	58H0000020	58H0000040	58H0000020
R350	2K (1%)	2K (1%)	1.5K (1%)	1.5K (1%)
	RN-4Z2001F	RN-4Z2001F	RN-4Z1501F	RN-4Z1501F
R351	2K (1%)	2K (1%)	1.5K (1%)	1.5K (1%)
	RN-4Z2001F	RN-4Z2001F	RN-4Z1501F	RN-4Z1501F
R556	1/6W 6.8K	1/6W 6.2K	1/6W 6.8K	1/6W 7.5K
	RD-AZ682J-	RD-AZ682J-	RD-AZ682J-	RD-AZ752J-
R823	3K	JUMPER	5.1K	JUMPER
	RD-4Z302J-	85801065GY	RD-4Z512J-	85801065GY
R920	1W 2 JA (F)	1W 0.47 JA (F)	1W 1 JA (F)	1W 0.18 JA (F)
	RF01Y200JA	RF01Y478JA	RF01Y100JA	RF01Y188JA

APPENDIX
ALIGNMENT INSTRUCTIONS

FUNCTIONAL DESCRIPTION OF VIDEO PROCESSOR Vision IF amplifier

The vision IF amplifier can demodulate signals with positive and negative modulation. The PLL demodulator is completely alignment-free.

The VCO of the PLL circuit is internal and the frequency is fixed to the required value by using the clock frequency of the µ-Controller/Teletext decoder as a reference. The setting of the various frequencies is made by the controlling software in subaddress 27H (33.9 MHz for system L ’and 38.9 MHz for all other systems). Because of the internal VCO, the IF circuit has a high immunity to EMC interference.

1. IF demodulator and audio amplifier

The FM demodulator is realised as a narrow band PLL with external loop filter, which provides the necessary selectivity without using an extra band pass filter. To obtain good selectivity a linear phase detector and a constant input signal amplitude are required. For this reason the intercarrier signal is internally supplied to the demodulator via a gain controlled amplifier and AGC circuit. The nominal frequency of the demodulator is set via a gain controlled amplifier and AGC circuit. The nominal frequency of the demodulator is tuned to the required frequency (5.5 / 6.0 / 6.5 MHz) by means of a calibration circuit which uses the clock frequency of the microcontroller as a reference. Selection of the required frequency is done by the controlling software.

Video switches

The video switch has one input for an external CVBS or Y/C signal. The selected CVBS signal can be supplied to pin 38, the IF video output. The selection between both signals is realised by the controlling software in subaddress 22H.

The video ident circuit is connected to the selected signal. This ident circuit is independent of the synchronisation.

Synchronisation circuit

The IC contains separator circuits for the horizontal and vertical sync pulses and a data-slicing circuit which extracts the digital teletext data from the analogue signal.

The horizontal drive signal is obtained from an internal VCO which is running at a frequency of 25 MHz. This oscillator is stabilised to this frequency by using a 12 MHz signal coming from the reference oscillator of the µ-Controller/Teletext decoder.

The horizontal drive is switched on and off via the soft start/stop procedure. This function is realised by means of variation of the TON of the horizontal drive pulses.

The vertical synchronisation is realised by means of a divider circuit. The vertical ramp generator needs an external resistor and capacitor. For the vertical drive a differential output current is available. The outputs are DC coupled to the vertical output stage.

The following geometry parameters can be adjusted:
- Horizontal shift
- Vertical amplitude
- Vertical slope
- S-correction
- Vertical shift

Chroma and luminance processing

The chroma band-pass and trap circuits (including the SECAM cloche filter) are realised by means of gyrators and are tuned to the right frequency by comparing the tuning frequency with the reference frequency of the colour decoder. The luminance delay line and the delay cells for the peaking circuit are also realised with gyrators. The circuit contains a black stretcher function which corrects the black level for incoming signals which have a difference between the black level and the blanking level.

Colour decoder

The ICs can decode PAL, NTSC and SECAM signals. The PAL/NTSC decoder does not need external reference crystals but has an internal clock generator which is stabilised to the required frequency by using the 12 MHz clock signal from the reference oscillator of the μ-Controller/Teletext decoder.

The Automatic Colour Limiting (ACL) circuit (switchable via the ACL bit in subaddress 2OH) prevents oversaturation occurring when signals with a high chroma-to-burst ratio are received. The ACL circuit is designed such that it only reduces the chroma signal and not the burst signal. This has the advantage that the colour sensitivity is not affected by this function.

SOFTWARE CONTROL

The CPU communicates with the peripheral functions using Special function Registers (SFRS) which are addressed as RAM locations. The registers for the Teletext decoder appear as normal SFRs in the μ-Controller memory map and are written to these functions by using a serial bus. This bus is controlled by dedicated hardware which uses a simple handshake system for software synchronisation.

For compatibility reasons and possible re-use of software blocks, the TV processor is controlled by I2C bus. The TV processor control registers cannot be read. Only the status registers can be read (Read address 8A).

The SECAM decoder contains an auto-calibrating PLL demodulator which has two references, via the divided 12 MHz reference frequency (obtained from the μ-Controller) which is used to tune the PLL to the desired free-running frequency and the bandgap reference to obtain the correct absolute value of the output signal. The VCO of the PLL is calibrated during each vertical blanking period, when the IC is in search or SECAM mode.

The base-band delay line (TDA 4665 function) is integrated. This delay line is also active during NTSC reception, to obtain a good suppression of cross colour effects. The demodulated colour difference signals are internally supplied to the delay line.

RGB output circuit and black-current stabilisation

In the RGB control circuit the signal is controlled on contrast, brightness and saturation. The ICs have a linear input for external RGB signals. The signals for OSD and text are internally supplied to the control circuit. The output signal has an amplitude of about 2 Volts black-to-white at nominal input signals and nominal settings of the various controls.

To obtain an accurate biasing of the picture tube the 'Continuous Cathode Calibration 'system has been included in these ICs. A black level off set can be made with respect to the level which is generated by the black current stabilisation system. In this way different colour temperatures can be obtained for the bright and the dark part of the picture.
The black current stabilisation system checks the output level of the 3 channels and indicates whether the black level of the highest output is in a certain window or below or above this window. This indication is read from the status byte 01 and is used for automatic adjustment of the Vg2 voltage during the production of the TV receiver.

During switch-off of the TV receiver a fixed beam current is generated by the black current control circuit. This current ensures that the picture tube capacitance is discharged. During the switch-off period the vertical deflection is placed in an overscan position so that the discharge is not visible on the screen.

2. IF

The TDA9361/TDA9381 has an alignment free IF PLL demodulator. The fully integrated oscillator is automatically calibrated, using the 12 MHz crystal as a frequency reference. The IF frequency is simply set in TV-Processor by I2C bus.
The AFC information is available via I2C bus from the TV-Processor status bytes. The controlling software uses this information for tuner frequency tracking (automatic following). The AFC window is typically 125Khz wide. The minimum frequency step of the tuner is 62.5 kHz.
This AFC function is disabled when a program is tuned using the direct frequency entry or after fine tuning adjustment. Therefore it is recommended to tune a channel with the TV search function (manual or ATSS) or by using the direct channel entry to enable the Automatic Frequency Control.

SAW filters

	TF	TK	TU	TA
SF01	G1984M	K2960M	J1981M	G1984M
SF02	-	-	-	L9653M

Ref.	Standard	Features
G1984M	B/G	- IF filter for Intercarrier Applications - TV IF filter with Nyquist slope and sound shelf. - High colour carrier level - Reduced group delay predistortion as compared with standard B/G, half
K2960M	B/G - D/K	- IF filter for Intercarrier Applications - TV IF filter with Nyquist slope and sound shelf.
J1981M	I	- IF filter for Intercarrier Applications - TV IF filter with Nyquist slope and sound shelf. - High colour carrier level - Constant group delay
L9653M	L / L '	- Switchable sound filter

For SECAM L and L 'the TDA9361/TDA9381 is switched to positive modulation via I2C bus. SECAM L 'transmission only occur in VHF band I and have their picture and sound carrier interchanged, compared to SECAM L and PAL B/G channels. For SECAM L 'the picture carrier is situated at 33.9 MHz and the AM sound carrier at 40.40 MHz. The IF PLL reference is tuned from 38.9 to 33.9 MHz, this is done via I2C Bus and the SIF filter is switched from channel 2 to channel 1; this is done by pin 4 of TDA 9361.
The tuner AGC time constant is slower for positive than for negative modulation, because the TDA9361 reduces its AGC current. To make the AGC time constant even slower an extra series resistor R103 is added. To prevent IF overload when jumping from a very strong transmitter to a weak transmitter a diode D101 has been added

****

The SAW filter (SF1) has a double Nyquist slope at 38.9 MHz and 33.9 MHz needed for this multistandard application.
The disadvantage of this choice is that a 5.5 MHz trap filter (Z501) is needed to suppress the residual sound carrier in the video for B/G signals.

****

3. Source switching

Video :
The TDA9361/TDA9381 has only one external video input. The SCART video in pin (#20) is connected to the front RCA video input.
The controlling software via I2C bus selects the signal source :
- Video signal from tuner (Pin 40).
- External video.
- External SVHS from SCART.

The sound source switching is done in the video processor part and in the AM demodulator by the μ-Controller via I2C bus.
The video processor pin 28 has multiple functions and provides in this application
- Deemphasis time constant
- Audio monitor output
- External AM input
- Deemphasis time constant : The time constant is given by the capacitor C504, needed to obtain the 54μs time constant for standard PAL signal.
- Audio monitor output : the nominal output signal is 500 mVrms, for all standards. The signal is also internally connected through to the audio switch. This signal is not controlled by the volume setting and can be used for SCART audio output.

The signal is buffered to avoid influencing the deemphasis time constant and to adjust the output level.
- External AM input : By software the deemphasis pin can be converted into an input pin. External AM signal for SECAM L/L 'is directly connected to this pin. In this configuration the FM sound is internally muted, DC level remains at 3Vdc.

An external sound signal of 500mVrms is applied to pin 35 via a coupling capacitor. The input impedance of this pin is 25KΩ typical. Switching between internal FM, external AM or external audio from SCART is controlled internally by software.

Fast R, G, B insertion : The external R, G, B insertion needs a fast switching and cannot be controlled by the software (instruction cycle of 1µ sec). The fast switching pin 16 of SCART is directly connected to the TV processor pin 45 (Fast blanking input). The display is synchronised with the selected video source, i.e. to get stable R, G, B signal insertion they must be synchronised with the selected video source.

4. µ-Controller I/O pin configuration and function

The I/O pins of the µ-Controller can be configured in many ways. All port functions can be individually programmed by the controlling software.
Each I/O port pin can be individually programmed in these configurations :

Open drain

In this mode, the port can function as input and output. It requires an external pull-up resistor. The maximum allowable supply voltage for this pull up resistor is +5V.
So in this mode it is possible to interface a 5 Volt environment like I2C while the µ-Controller has a 3.3 Volt supply.

Push-Pull

The push pull mode can be used for output only. Both sinking and sourcing is active, which leads to steep slopes. The levels are 0 and Vddp, the supply voltage 3.3Volts.

High impedance

This mode can be used for input only operation of the port.

Special port for LED

Pin 10 and 11 have the same functionality as the general I/O pins but in addition, their current source and sink capacity is 8 mA instead of 4 mA. These pins are used for driving LED's via a series current limiting resistor.

µ-Controller I/O pin configuration and function table

pin	name	configuration		description
		Stand by	TV ON	
1	n.u.	High impedance	High impedance	not used
2	SCL	Open Drain	Open Drain	Serial clock line
3	SDA	Open Drain	Open Drain	Serial data line
4	SECAM L'	High impedance	Push Pull / High impedance	SIF filter switching + AM/FM switching
5	OCP	High impedance	High impedance	Over Current Protection (Switch the set OFF if the voltage on this pin is <2.3V)
6	RF AGC in	High impedance	High impedance	Used during ATSS to measure RF signal level.
7	Key in	High impedance	High impedance	Local keyboard input
8	S/SW	High impedance	High impedance	external video switch
10	Red LED	High impedance	Open Drain	
11	Green LED	Open Drain	High impedance	
62	Audio mute	Push Pull	High impedance	

5. SECAM L/L ' sound switching circuit.

The microcontroller pin 4 is a three levels output. The voltage and configuration of this port is described below :

Sound mode	Port configuration	Voltage
FM	Push Pull	Internally shorted to ground
AM L	Push Pull	Pull up to 3.3V
AM L '	High Impedance	Fixed by R511, R156, R157

In FM mode the microcontroller is internally grounded to pin 4. The TDA9830 output is muted

6. Sound amplification

The device TDA7267A is a mono audio amplifier in powerDIP package specially designed for TV application. Thanks to the fully complementary output configuration the device delivers a rail to rail voltage swing without need of bootstrap capacitors. No external heat sink is needed as the Cu ground plane of the PCB is used as heat dissipation.

7. Vertical deflection

The vertical driver circuit is a bridge configuration. The deflection coil is connected between the output amplifiers, which are driven in phase opposition. The differential input circuit is voltage driven. The input circuit is especially intended for direct connection to driver circuits which deliver symmetrical current signals, but is also suitable for asymmetrical currents. The output current of these devices is converted to voltages at the input pins via resistors R350 and R351. The differential input voltage is compared with the output current through the deflection coils measured as voltage across R302, which provides internal feedback information. The voltage across R302 is proportional to the output current.

Flyback voltage

The flyback voltage is determined by an additional supply voltage V_{fb}. The principle of operation with two supply voltages (class G) makes it possible to fix the supply voltage Vp optimum for the scan voltage and the second supply voltage V_{fb} optimum for the flyback voltage. Using this method, very high efficiency is achieved. The supply voltage V_{fb} is almost totally available as flyback voltage across the coil, this being possible due to the absence of a coupling capacitor.

Protection

The output circuit has protection circuits for :

- Too high die temperature
- overvoltage of output stage A

Guard circuit

The guard signal is not used by the TDA9361/ TDA9381 to blank the screen in case of a fault condition.

Damping resistor

For HF loop stability a damping resistor (R305) is connected across the deflection coil.

8. Power supply (STR F6653)

8-1. STR-F6653 general description

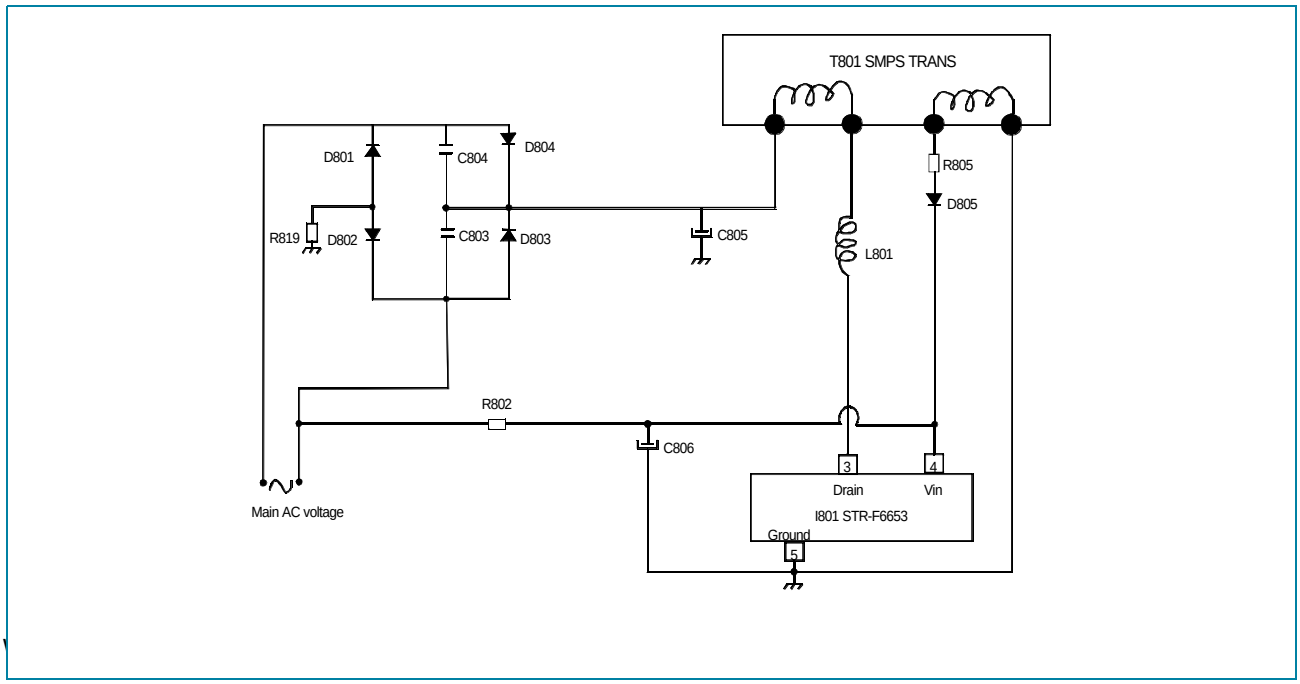
The STR-F6653 is an hybrid IC with a build-in MOSFET and control IC, designed for flyback converter type switch mode power supply applications.

8-2. Power supply primary part operations

An oscillator generates pulse signals which turn on and off a MOSFET transistor.

8-2-1. Start -up circuit: V_{IN}

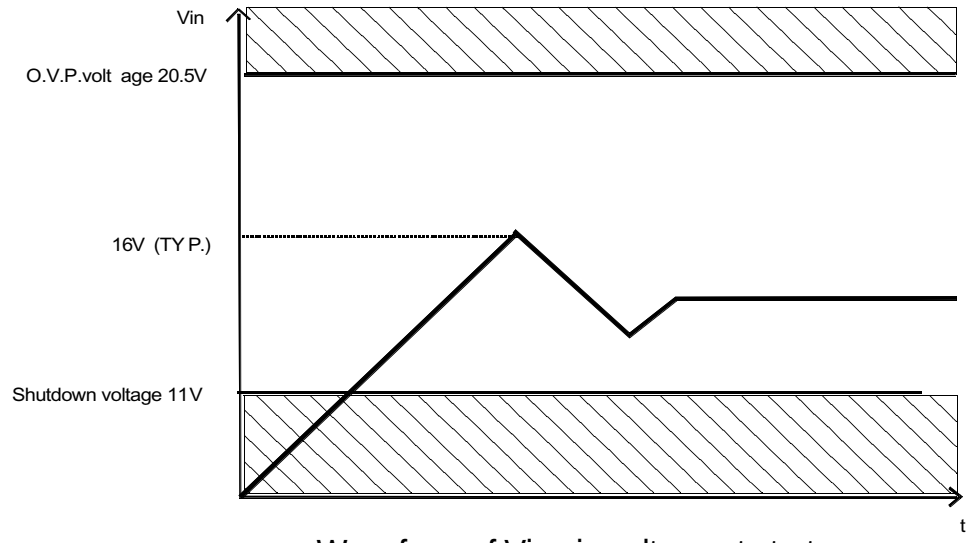
The start-up circuit is used to start and stop the operation of the control IC, by detecting a voltage appearing at the V_{IN} pin (pin 4).



As soon as V_{IN} reaches 16V, the STR-F6653 control circuit starts operating. Then, V_{IN} is obtained by smoothing the winding voltage which appears between pin 6 and pin 7 of the SMPS transformer.

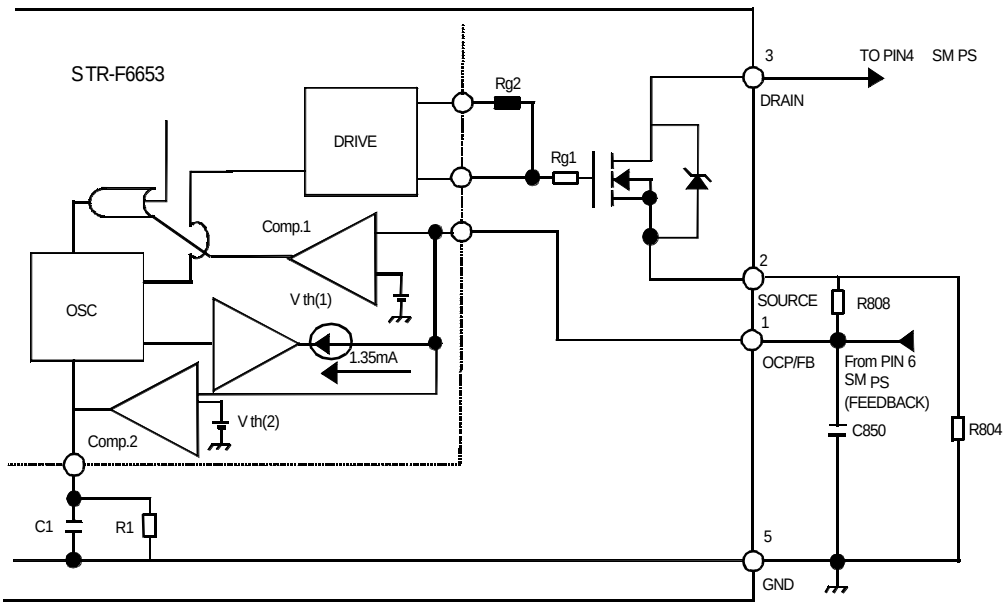
As this winding voltage does not increase to the set voltage immediately after the control circuit starts operating, V_{IN} starts dropping. However, as this winding voltage reaches the set value before V_{IN} voltage drops to the shutdown voltage (at 11V), the control circuit continues operating (see below, V_{IN} voltage at start-up). Resistor R805 prevents variations of voltage at the V_{IN} pin, as some regulation of the SMPS transformer occurs due to secondary side output current

V_{IN} must be set higher than the shutdown voltage (V_{IN} (off) = $11V_{max}$) and lower than the O.V.P. (overvoltage protection) operating voltage (V_{OVP} = $20.5V_{min}$).

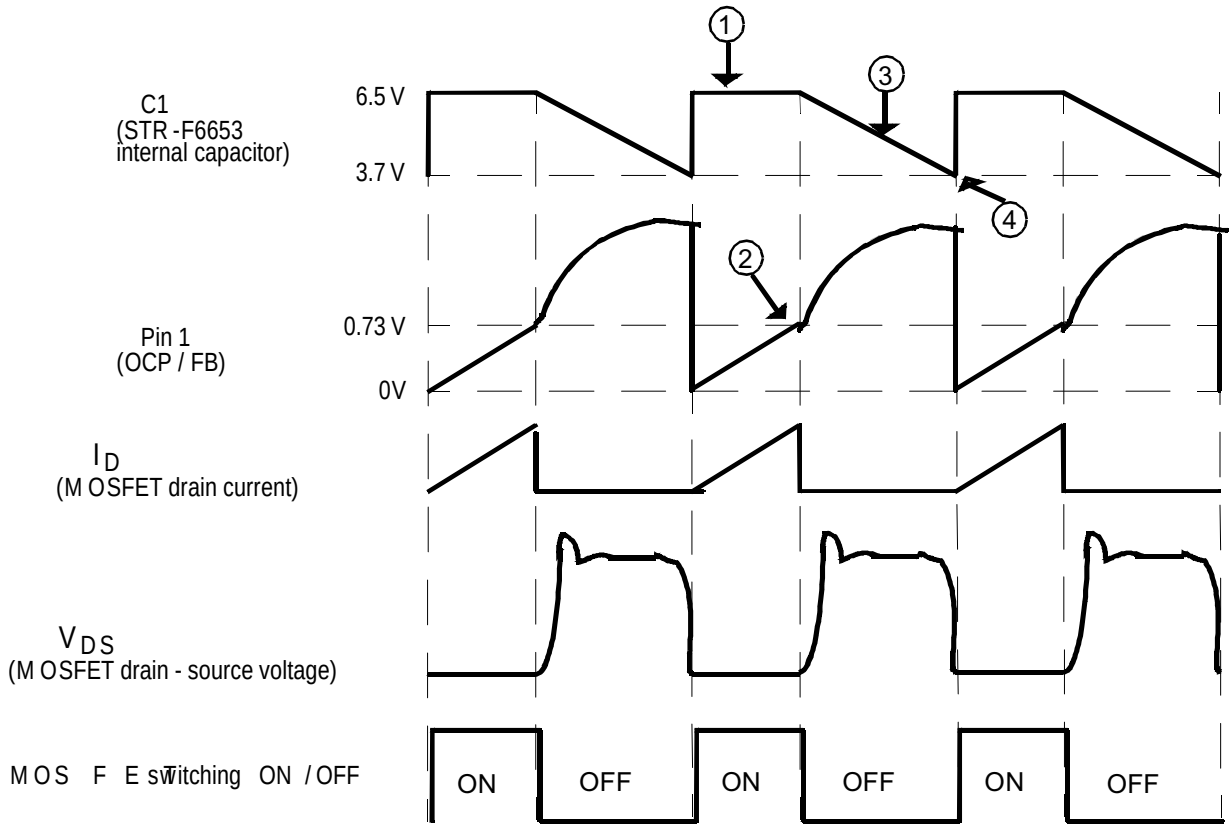


Waveform of Vin pin voltage at start- up

8-2-1. STR-F6653 oscillating operation



Oscillating operation



Waveforms during oscillating operation

- When the MOSFET is ON, the STR-F6653 internal capacitor C1 is charged at the constant voltage 6.5V.
At the same time, the voltage at pin 1 (OCP / FB) increases with the same waveform as the MOSFET drain current.

- When the pin 1 voltage reaches the threshold voltage V_{TH1} = 0.73V, the STR-F6653 internal comparator 1 starts operating. The STR-F6653 internal oscillator is inverted and the MOSFET turns OFF.

- When the MOSFET turns OFF, charging of STR-F6653 internal capacitor C1 is released and C1 starts discharging by the STR-F6653 internal resistance R1. So, C1 voltage starts falling in accordance to the gradient regulated by the constant discharging time of C1 and R1. So, this means that the fixed time determined by C1 and R1 is the OFF-time of the MOSFET.

- When C1 voltage falls to around 3.7V, the STR-F6653 internal oscillator is reversed again and the MOSFET turns ON. C1 is quickly charged to around 6.5V

The MOSFET continues to oscillate by repeating the above procedure.

8-2-3. STR-F6653 protection circuits

overcurrent protection function (OCP)

Overcurrent protection is performed pulse by pulse detecting at STR-F6653 pin 1 (OCP) the peak of the MOSFET drain current in every pulse.

latch circuit

This circuit sustains an output low from the STR-F6653 internal oscillator and stops operation of the power supply when over-voltage protection (OVP) and thermal shutdown (TSD) circuit are in operation

thermal shutdown circuit (TSD)

This circuit triggers the latch circuit when the frame temperature of STR-F6653 IC exceeds 140°C

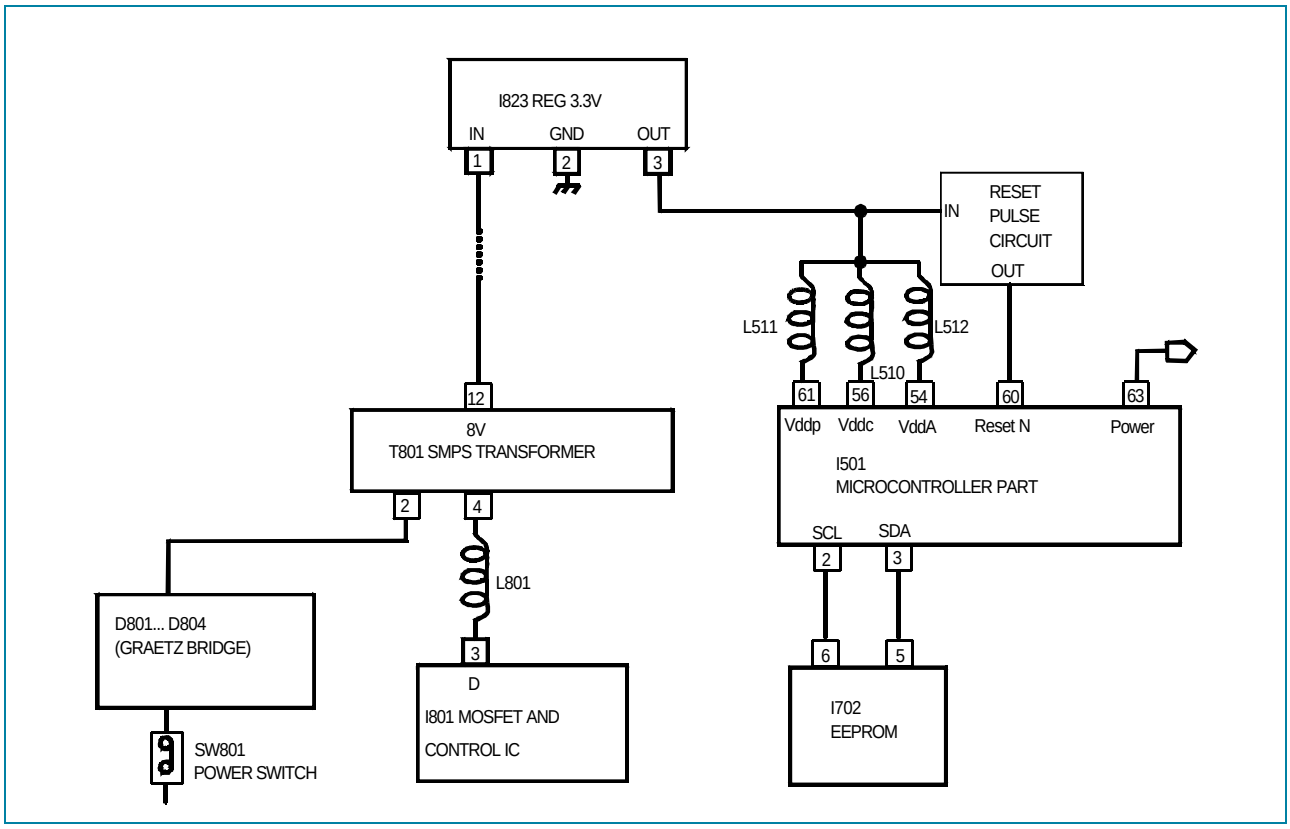
overvoltage protection circuit (OVP)

This circuit triggers the latch circuit when the V_{in} voltage exceeds 22V (typ.)

9. TV start-up, TV normal run and stand by mode operations

9-1. TV start-up operations

9-1-1. Schematic diagram for start-up operations



9-1-2. TV start-up and microcontroller initialisation

- When SW801 power switch is pushed, main AC voltage is applied to T801 transformer (after rectification by D801...D804 diodes). Then, T801 SMPS transformer starts operating and supplies DC voltage to I823 (3.3V regulator).

- This regulator provides 3.3V DC voltage to I501 microcontroller power supply pins (pins 54, 56, 61) and to the reset pulse circuit which provides reset pulse to I501 microcontroller reset pin (pin 60).

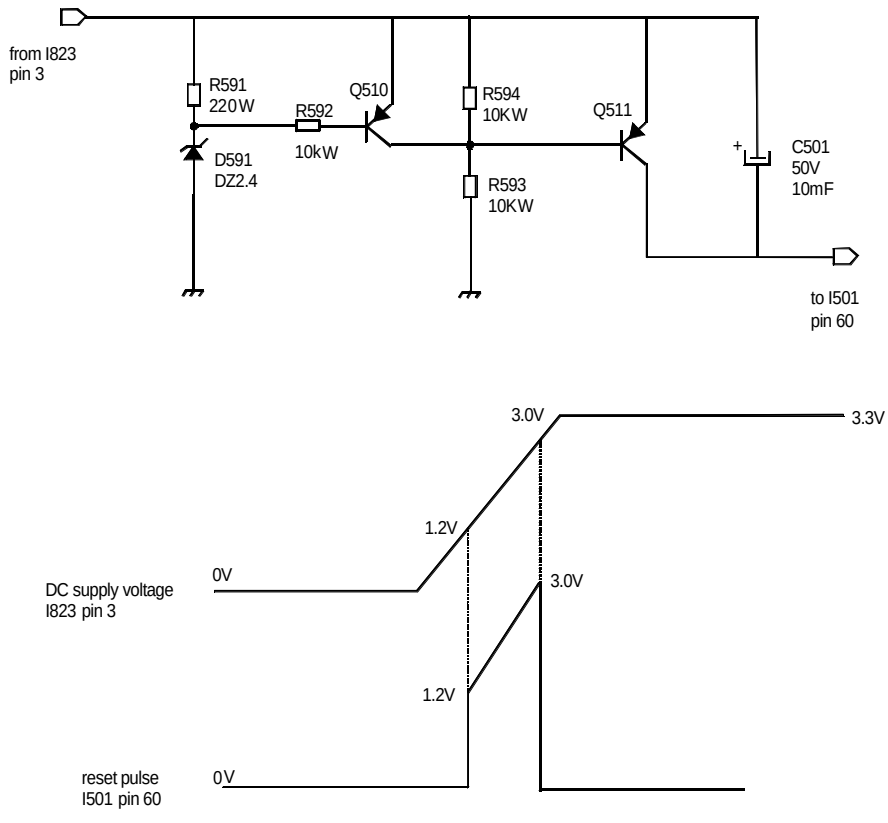
- Then, the microcontroller starts its initialisation. Its power pin (pin 63) is set to high which allows delivery of power supply voltages (110/123V, 8V, 5V...). At this step, all IC's start working but no picture appears on screen: I501 IC doesn't provide horizontal drive voltage.

- Then, the microcontroller consults I702 EEPROM via I2C bus to know the last TV set mode (normal run mode or stand-by mode) before switching off.

. If the TV set was on normal run mode before switching off, the microcontroller delivers horizontal drive voltage at pin 33 and picture appears on screen.

. If the TV set was on stand-by mode before switching off, the microcontroller switches TV set to stand-by mode, decreasing power pin voltage (pin 63). This matter will be explained in paragraph 2.2.

9-1-3 Reset pulse circuit:



Reset pulse circuit and corresponding waveforms

9-1-4. Reset pulse circuit operations description

- When DC supply voltage from I823 regulator starts rising (from 0V to 1.2V), no current flows through D591 zener diode. So, Q510 is in off mode.
Also $V_{be\ Q511}$ =Vcc/2 -Vcc = -Vcc/2 > -0.6V. So, Q511 is in off mode.
Then, no voltage reaches I501 pin 60.

- When this voltage reaches 1.2 V, Q510 stays in off mode
but $V_{be\ Q511}$ = -0.6V. So, Q511 is switched on and starts driving DC supply voltage to I501 pin 60.

- When the DC supply voltage reaches (2.4V +0.6V) =3.0V, Q510 starts conducting but as the Q511 base-emitter voltage is the same as the collector-emitter voltage of the saturated Q510, Q511 switches off and no voltage reaches I501 pin 60.

- If the DC supply voltage decreases below 3 V, Q510 switches off immediately. Q511 starts conducting, pulling I501 pin 60 high. At the same time, it discharges the reset capacitor C501. Discharging this capacitor is necessary to guarantee a defined reset pulse duration.

9-2. TV normal run and stand-by mode operations

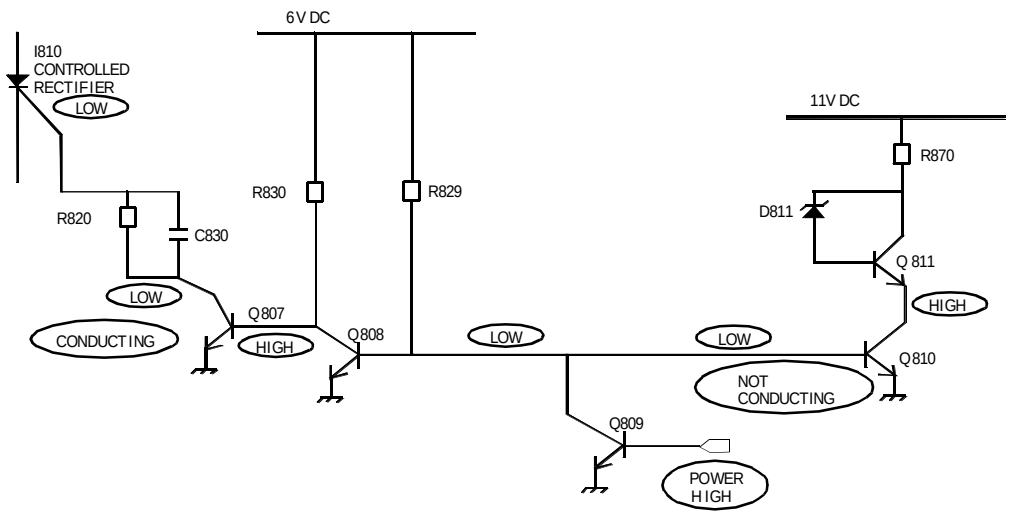
Depending on remote control commands, I501 microcontroller part pin 63 (power) is set to:

- high for normal run mode
- low for stand-by mode

9-2-1. TV on normal run mode

9-2-1-1. I501 microcontroller part pin 63 (power) effect

I501 microcontroller part pin 63 (power) is connected to the following circuit:



I501 microcontroller part pin 63 (POWER) effect

In normal run mode, I501 microcontroller pin 63 (power) is set to high

So, I810 controlled rectifier is not conducting

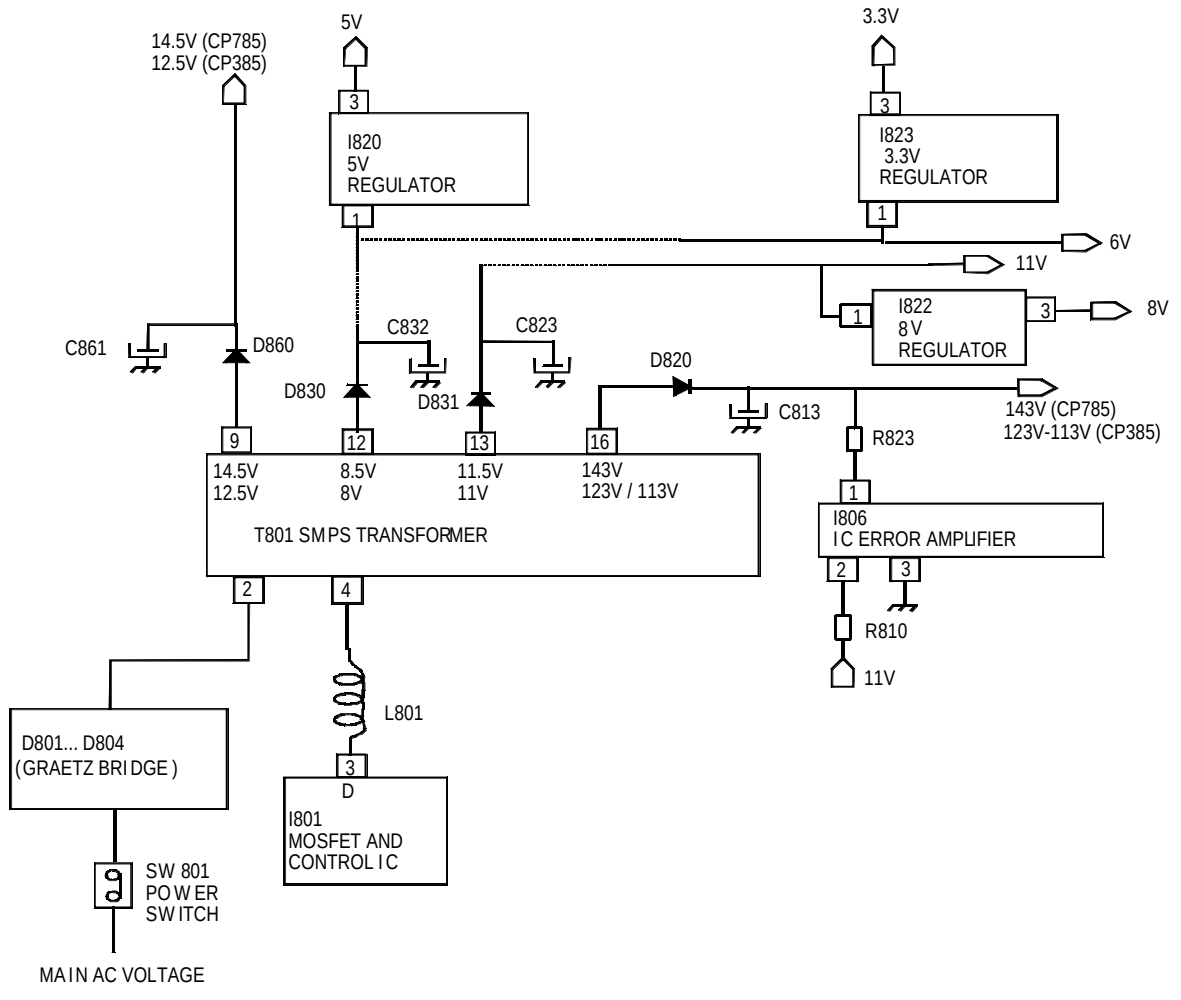
- Q809 is conducting. So, Q808 is not conducting and Q807 is conducting
- So, Q807 collector is connected to the ground and I810 controlled rectifier gate pin is set to low (no conducting)

So, current from 11V DC voltage (from T801 SMPS transformer pin 13) does not flow through Q811 and Q810 transistors but flows through I806 IC error amplifier

- Q809 is conducting. So, Q810 is not conducting and no current flows from Q810 collector to the ground

Therefore, the power circuit diagram is the following one:

9-2-1-2. power supply circuit diagram during TV set normal run



Power supply operation during TV set normal run

9-2-1-3. power supply functioning during TV set normal run mode

- I801 transmits controlled pulses to T801 which generates DC voltages after rectification by secondary side diodes and electrolytic capacitors (for example by D820 and C813 to give 124V -110V supply voltage line).

- 8V, 5V, 3.3V supply voltage lines have stabilised voltages obtained by I822, I820, I823 voltage regulators.

- On 124V-110V supply voltage line, R823 resistor has been chosen to give the exact DC voltage required on this line.

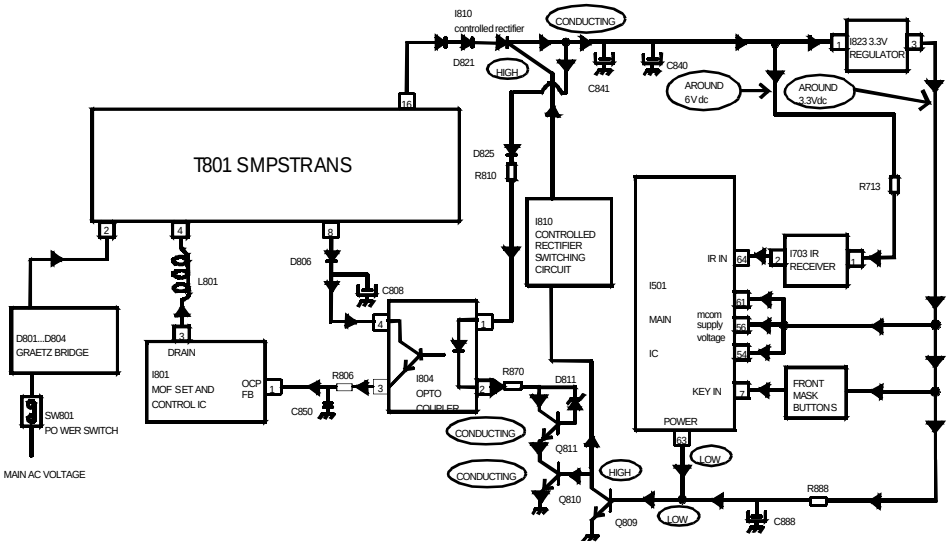
- 124V-110V supply voltage line includes an IC error amplifier (I806) which corrects unexpected DC voltage variations on this line.

9-2-1-4. power supply IC delivery during TV set normal run

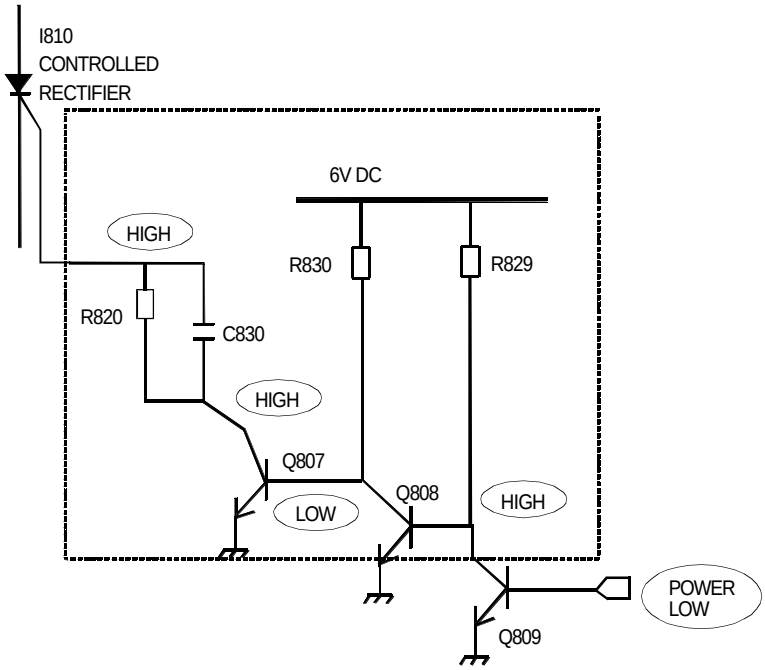
power supply line	IC power supply delivery	Remarks
124V-110V	FBT	FBT supplies 45V to I301 vertical IC FBT supplies 14V to I301 vertical IC FBT supplies 33V to the tuner FBT supplies 185V to I901 video amplifier pin 6
13.5V	I601 pin 1	
11V	T401 H- drive	
8V	I501 Main IC pins 14-39	
6V	I703 IR receiver pin 1	
5V	I702 EEPROM pin 8	
	tuner	
3.3V	Main IC µcom part pins 54-56-61	

9-2-2. TV set in stand-by mode

9-2-2-1. TV set circuit diagram in stand-by mode



Power supply operation in stand - by mode



I810 controlled rectifier switching circuit

9-2-2-2. TV set stand-by mode operations

-In stand-by mode, I501 microcontroller pin 63 (power) is set to low.
- So, Q809 collector is set to high.
-Then, I810 controlled rectifier gate pin is set to high and I810 is conducting.
- So, current flows from pin 16 SMPS transformer to the ground via I804 optocoupler and Q810 and Q811 transistors (which are conducting).
- In these conditions, I801 delivers pulses on light mode and T801 produces voltages with reduced power.
- As I810 is conducting, current flows also from pin 16 SMPS transformer to I823 (3.3V regulator) for I501 µcom, IR receiver and front mask buttons supply voltage (then, remote control or front mask buttons can be activated to leave stand-by mode).

IC DESCRIPTION

1. TDA9361 : TV signal processor - Teletext decoder with embedded μ-Controller.
   TDA9381 : TV signal processor - with embedded μ-Controller.

TV-signal Processor

- Multi-standard vision IF circuit with alignment-free PLL demodulator
- Internal (switchable) time-constant for the IF-AGC circuit
- Mono intercarrier with a selective FM-PLL demodulator which can be switched to the different FM sound frequencies (5.5 / 6.0 / 6.5 MHz)
- Source selection between 'Internal' CVBS and external CVBS or Y/C signals
- Integrated chrominance trap circuit
- Integrated luminance delay line with adjustable delay time
- Asymmetrical 'delay line type 'peaking in the luminance channel
- Black stretching for non-standard luminance signals
- Integrated chroma band-pass filter with switchable centre frequency
- Only one reference (12 MHz) crystal required for the μ-Controller, Teletext and the colour decoder
- PAL / NTSC or multistandard colour decoder with automatic search system
- Internal base-band delay line
- RGB control circuit with 'Continuous Cathode Calibration', white point and black level off set adjustment so that the colour temperature of the dark and the bright parts of the screen can be chosen independently.
- Linear RGB or YUV input with fast blanking for external RGB/YUV sources. The Text/OSD signals are internally supplied from the μ-Controller/Teletext decoder
- Contrast reduction possibility during mixed-mode of OSD and Text signals
- Horizontal synchronisation with two control loops and alignment-free horizontal oscillator
- Vertical count-down circuit
- Vertical driver optimised for DC-coupled vertical output stages
- Horizontal and vertical geometry processing

μ-Controller

- 80C51 μ-controller core standard instruction set and timing
- 1μs machine cycle
- 64Kx8-bit programmed ROM
- 3 - 12Kx8-bit Auxiliary RAM (shared with Display and Acquisition)
- Interrupt controller for individual enable/disable with two level priority
- Two 16-bit Timer/Counter registers
- watchdog timer
- Auxiliary RAM page pointer
- 16-bit Data pointer
- IDLE and Power Down (PD) mode
- 8-bit A/D converter
- 4 pins which can be programmed as general I/0 pin or ADC input.

Data Capture

- Text memory 10 pages
- Inventory of transmitted Teletext pages stored in the Transmitted Page Table (TPT) and Subtitle Page Table (SPT)
- Data Capture for 525/625 line WST, VPS (PDC system A) and Wide Screen Signalling (WSS) bit decoding Automatic selection between 525 WST/625 WST
- Automatic selection between 625 WST/VPS on line 16 of VBI
- Real-time capture and decoding for WST Teletext in Hardware, to enable optimised µ-processor throughput
- Automatic detection of FASTEXT transmission
- Real-time packet 26 engine in Hardware for processing accented, G2 and G3 characters
- Signal quality detector for video and WST/VPS data types
- Comprehensive teletext language coverage
- Full Field and Vertical Blanking Interval (VBI) data capture of WST data

Display

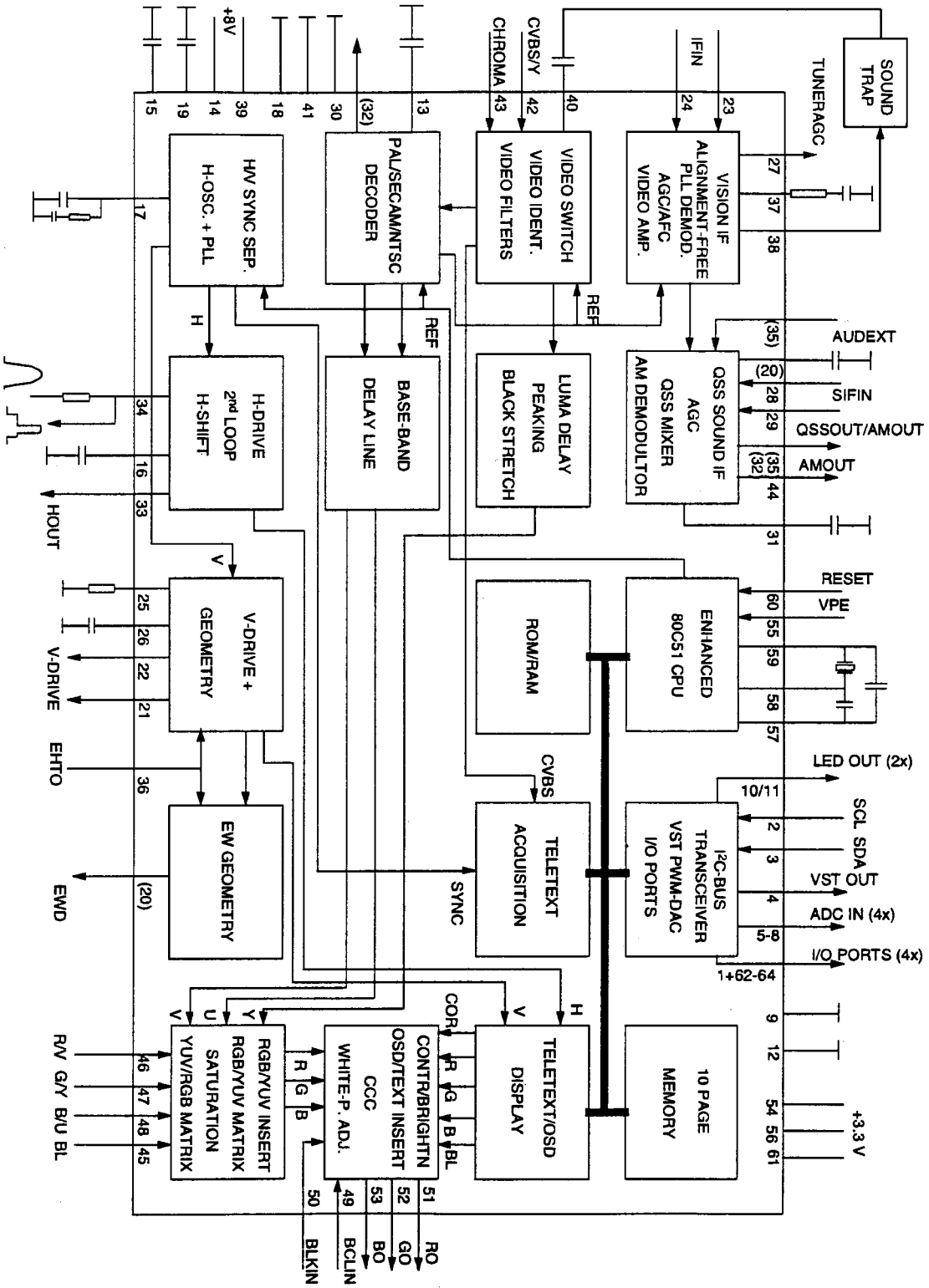
- Teletext and Enhanced OSD modes
- Features of lever 1.5 WST.
- Serial and Parallel Display Attributes
- Single/Double/Quadruple Width and Height for characters
- Scrolling of display region
- Variable flash rate controlled by software
- Enhanced display features including overlining, underlining and italics
- Soft colours using CLUT with 4096 colour palette
- Globally selectable scan lines per row (9/10/13/16) and character matrix [12x10, 12xl3, 12x16 (VxH)]
- Fringing (Shadow) selectable from N-S-E-W direction
- Fringe colour selectable
- Meshing of defined area
- Contrast reduction of defined area
- Cursor
- Special Graphics Characters with two planes, allowing four colours per character
- 32 software redefinable On-Screen display characters
- 4 WST Character sets (GO/G2) in single device (e.g. Latin, Cyrillic, Greek, Arabic)
- G1 Mosaic graphics, Limited G3 Line drawing characters
- WST Character sets and Closed Caption Character set in single device

Data Capture

The Data Capture section takes in the analogue Composite Video and Blanking Signal (CVBS), and from this extracts the required data, which is then decoded and stored in memory.
The extraction of the data is performed in the digital domain. The first stage is to convert the analogue CVBS signal into a digital form. This is done using an ADC sampling at 12MHz. The data and clock recovery is then performed by a Multi-Rate Video Input Processor (MuIVIP). From the recovered data and clock the following data types are extracted WST Teletext (625/525), Closed Caption, VPS, WSS. The extracted data is stored in either memory (DRAM) via the Memory Interface or in SFR locations.

Data Capture Features

- Video Signal Quality detector
- Data Capture for 625 line WST
- Data Capture for 525 line WST
- Data Capture for US Closed Caption
- Data Capture for VPS data (PDC system A)
- Data Capture for Wide Screen Signalling (WSS) bit decoding
- Automatic selection between 525 WST/625WST
- Automatic selection between 625WST/VPS on line 16 of VBI
- Real-time capture and decoding for WST Teletext in Hardware, to enable optimised microprocessor throughput
- 10 pages stored On-Chip
- Inventory of transmitted Teletext pages stored in the Transmitted Page Table (TPT) and Subtitle Page Table (SPT)
- Automatic detection of FASTEXT transmission
- Real-time packet 26 engine in Hardware for processing accented, G2 and G3 characters
- Signal quality detector for WST/VPS data types
- Comprehensive Teletext language coverage
- Full Field and Vertical Blanking Interval (VBI) data capture of WST data


SOUND TRAP
TUNERAGC
IFIN
CVBS/Y
CHROMA
+8V
VISION IF ALIGNMENT-FREE PLL DEMOD. AGC/AFC VIDEO AMP.
VIDEO SWITCH VIDEO IDENT. VIDEO FILTERS
PAL/SECAM/NTSC DECODER
H/V SYNC SEP. H-OSC. + PLL
AUDEXT
SIFIN
QSSOUT/AMOUT
AMOUT
QSS SOUND IF AGC QSS MIXER AM DEMODULTOR
LUMA DELAY PEAKING BLACK STRETCH
BASE-BAND DELAY LINE
H-DRIVE 2nd LOOP H-SHIFT
HOUT
V-DRIVE + GEOMETRY
V-DRIVE
EHTO
EW GEOMETRY
EWD
ROM/RAM
ENHANCED 80C51 CPU
RESET
VPE
LED OUT (2x)
CVBS
TELETEXT ACQUISITION
SYNC
I²C-BUS TRANSCEIVER VST PWM-DAC I/O PORTS
SCL
SDA
VST OUT
ADC IN (4x)
I/O PORTS (4x)
1+62-64
TELETEXT/OSD DISPLAY
10 PAGE MEMORY
+3.3 V
CONTR/BRIGHTN OSD/TEXT INSERT CCC WHITE-P. ADJ.
RGB/YUV INSERT
RGB/YUV MATRIX
SATURATION
YUV/RGB MATRIX
R/V
G/Y
B/U
BL
BLKIN
BCLIN
RO
GO
BO

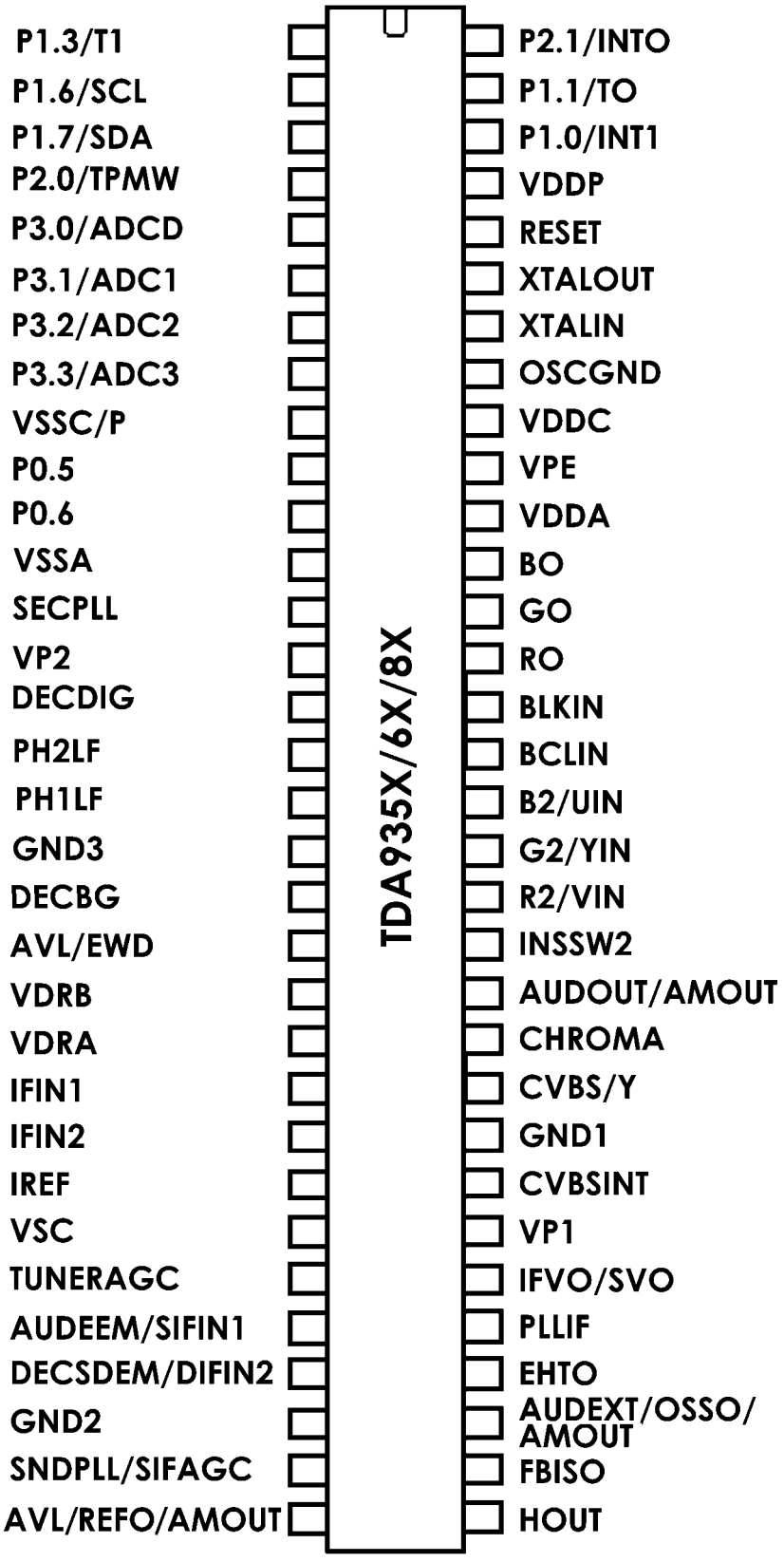
IC marking and version

Chassis	IC marking (line 3)	OSD languages	Text
CP 185	DW9361/N1/3-DE1 (note : x is the software version)	English, French, German, Italian, Spanish, Dutch, Danish, Finnish, Norwegian, Swedish, Greek, Hungarian,	English, German, Swedish/Finnish/Hungarian, Italian, French, Portuguese/Spanish, Turkish, Greek
		Polish, Czech, Rumanian	Polish, German, Estonian, Italian, French, Serbian/Croatian/Slovenian, Czech/Slovak, Rumanian
		Russian	Polish, German, Estonian, Russian/ Bulgarian, Serbian/Croatian/Slovenian, Czech/Slovak, Rumanian
CP 185	DW9381/N1/3-DE1 (note : x is the software version)	English, French, German, Italian, Spanish, Dutch, Danish, Finnish, Norwegian, Swedish, Polish, Russian, Hungarian, Czech, Rumanian, Greek	No teletext

PINNING

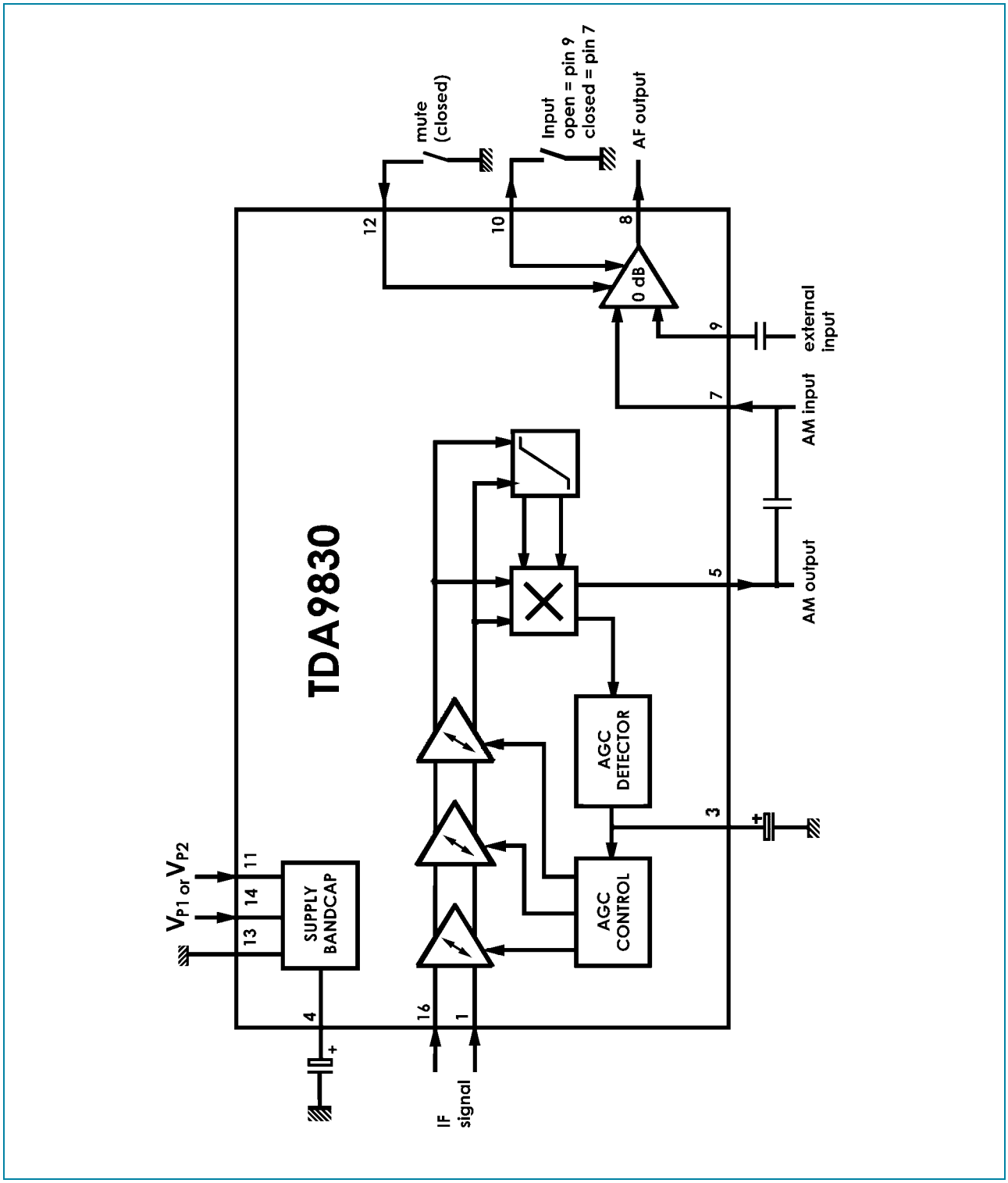
SYMBOL	PIN	DESCRIPTION
n.u.	1	Port 1.3 Not used.
SCL	2	I2C bus clock line
SDA	3	I2C Data line
SECAM L ’out	4	Port 2.0 : FM sound : PushPull Low AM SECAM L ’: PushPull High AM SECAM L : High Impedance
OCP	5	Port 3.0 : Over Current Protection
RF AGC in	6	ADC 1 : For program sorting in ATSS (High Impedance)
Key-in	7	ADC 2 : local key input (High impedance)
S/SW	8	ADC 3 : Scart Slow switching input
VssC/P	9	digital ground for µ-controller core and peripheral
LED 1	10	port 0.5 (8mA current sinking capability)
LED 2	11	port 0.6 (8mA current sinking capability)
VSSA	12	analog ground of teletext decoder and digital ground of TV processor
SEC PLL	13	SECAM PLL decoupling
VP2	14	2nd supply voltage TV-processor
DECDIG	15	decoupling digital supply of TV-processor
PH2LF	16	phase-2 filter
PH1LF	17	phase-1 filter
GND3	18	ground 3 for TV-processor
DECBG	19	bandgap decoupling
AVL	20	n.u.
VDRB	21	vertical drive B output
VDRA	22	vertical drive A output

IFIN1	23	IF input 1
IFIN2	24	IF input 2
IREF	25	Reference current input
VSC	26	vertical sawtooth capacitor
TUNERAGC	27	tuner AGC output
AUDEEM	28	audio deemphasis
DECSDEM	29	decoupling sound demodulator
GND2	30	ground 2 for TV processor
SNDPLL	31	narrow band PLL filter
SNDIF	32	n.u.
HOUT	33	horizontal output
FBISO	34	flyback input / sandcastle output
AUDEXT	35	external audio input
EHT0	36	EHT/Overvoltage protection
PLLIF	37	IF PLL loop filter
IFVO	38	IF video output
VP1	39	main supply voltage TV-processor
CVBSINT	40	internal CVBS input
GND1	41	ground 1 for TV-processor
CVBS/Y	42	external CVBS/Y input
CHROMA	43	chrominance input (SVHS)
AUDOUT	44	audio out
INSSW2	45	2nd RGB insertion input
R2IN	46	2nd R input
G2IN	47	2nd G input
B2IN	48	2nd B input
BCLIN	49	beam current limiter input
BLKIN	50	black current input
R0	51	RED Output
G0	52	GREEN Output
B0	53	BLUE Output
VDDA	54	analog supply of Teletext decoder and digital supply of TV-Processor (3.3V)
VPE	55	OTP programming supply
VDDC	56	digital supply to core (3.3V)
OSCGND	57	oscillator ground supply
XTALIN	58	crystal oscillator input
XTALOUT	59	crystal oscillator output
RESET	60	reset
VDDP	61	digital supply to periphery (3.3V)
Audio Mute	62	Port 1.0 : Audio mute output (PushPull)
Power	63	Port 1.1 : Power output (PushPull)
IR in	64	Interrupt input 0 : R/C Infrared input


P1.3/T1
P1.6/SCL
P1.7/SDA
P2.0/TPMW
P3.0/ADCD
P3.1/ADC1
P3.2/ADC2
P3.3/ADC3
VSSC/P
P0.5
P0.6
VSSA
SECPLL
VP2
DECDIG
PH2LF
PH1LF
GND3
DECBG
AVL/EWD
VDRB
VDRA
IFIN1
IFIN2
IREF
VSC
TUNERAGC
AUDEEM/SIFIN1
DECSDEM/DIFIN2
GND2
SNDPLL/SIFAGC
AVL/REFO/AMOUT
TDA935X/6X/8X
P2.1/INTO
P1.1/TO
P1.0/INT1
VDDP
RESET
XTALOUT
XTALIN
OSCGND
VDDC
VPE
VDDA
BO
GO
RO
BLKIN
BCLIN
B2/UIN
G2/YIN
R2/VIN
INSSW2
AUDOUT/AMOUT
CHROMA
CVBS/Y
GND1
CVBSINT
VP1
IFVO/SVO
PLLIF
EHTO
AUDEXT/OSSO/
AMOUT
FBISO
HOUT

2. TDA9830 TV sound AM-Demodulator and audio source switch

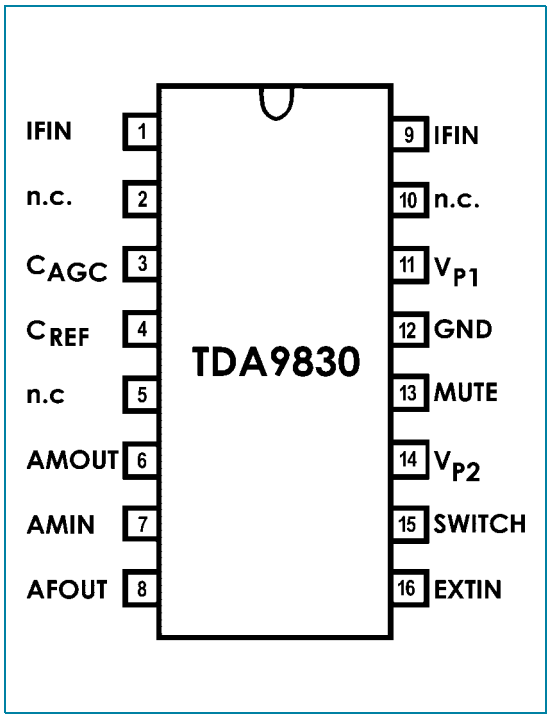
The TDA9830, a monolithic integrated circuit, is designed for AM-sound demodulation used in L and L ’standard. The IC provides an audio source selector and also mute switch.



Block Diagram : TDA9830

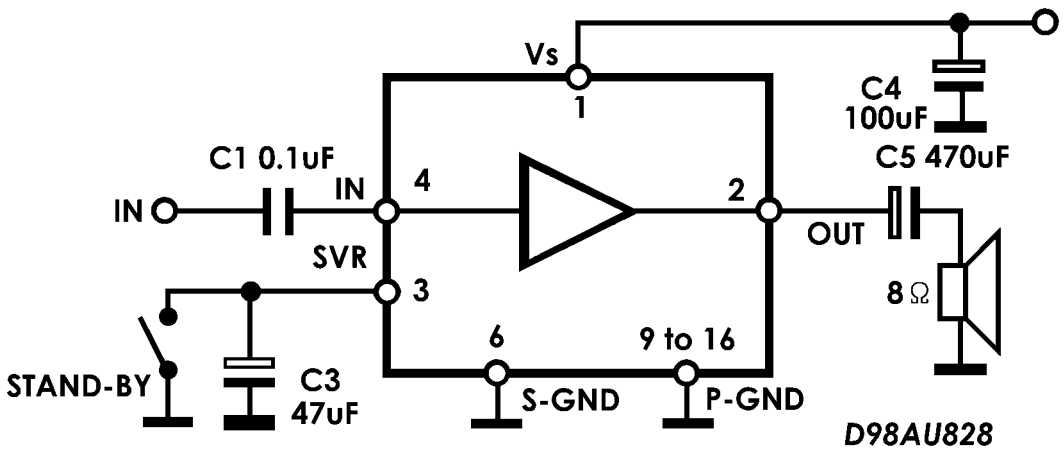
Pinning

Symbol	Pin	Description
IFIN	1	Sound IF differential input signal
n.c.	2	Not connected
C_{AGC}	3	AGC capacitor
C_{REF}	4	REF voltage filtering capacitor
n.c.	5	Not connected
AMOUT	6	AM demodulator output
AMIN	7	Input signal from audio switch
AFOUT	8	Output signal from audio switch
EXTIN	9	Input signal (from external) to audio switch
SWITCH	10	Switch input select control
V_{P2}	11	Supply voltage +12V (alternative)
MUTE	12	Mute control
GND	13	Ground (0V)
V_{P1}	14	Supply voltage +5V to +8V
n.c.	15	Not connected
IFIN	16	Sound IF differential input signal



3. TDA7267A - 3W Mono amplifier

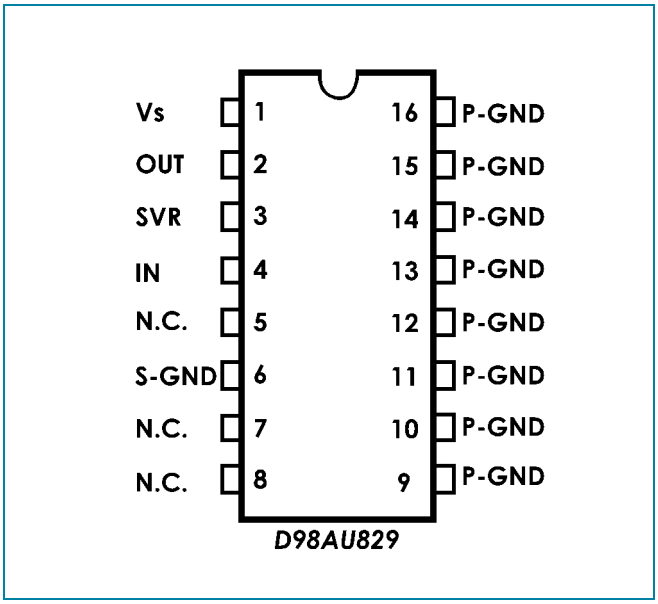
•Can deliver 3W THD 10% 14.5V/8 Ω
•Internal fixed gain 32dB
•No feedback capacitor
•No boucherot cell
•Thermal protection
•AC short circuit protection
•SVR capacitor for better ripple rejection
•Low turn ON/OFF pop
•Stand-by mode



Block Diagram

Pinning

Symbol	Pin	Description
Vcc	1	Supply voltage
OUT	2	Audio output
SVR	3	Supply Voltage Rejection
IN	4	Audio input
n.c.	5	Not Connected
S-GND	6	Signal ground
n.c.	7	Not Connected
n.c.	8	Not Connected
P-GND	9	P Ground
P-GND	10	P Ground
P-GND	11	P Ground
P-GND	12	P Ground
P-GND	13	P Ground
P-GND	14	P Ground
P-GND	15	P Ground
P-GND	16	P Ground



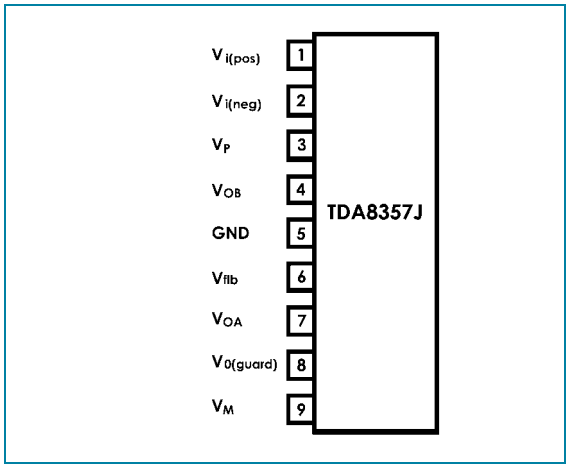
4. TDA8357J Vertical Amplifier

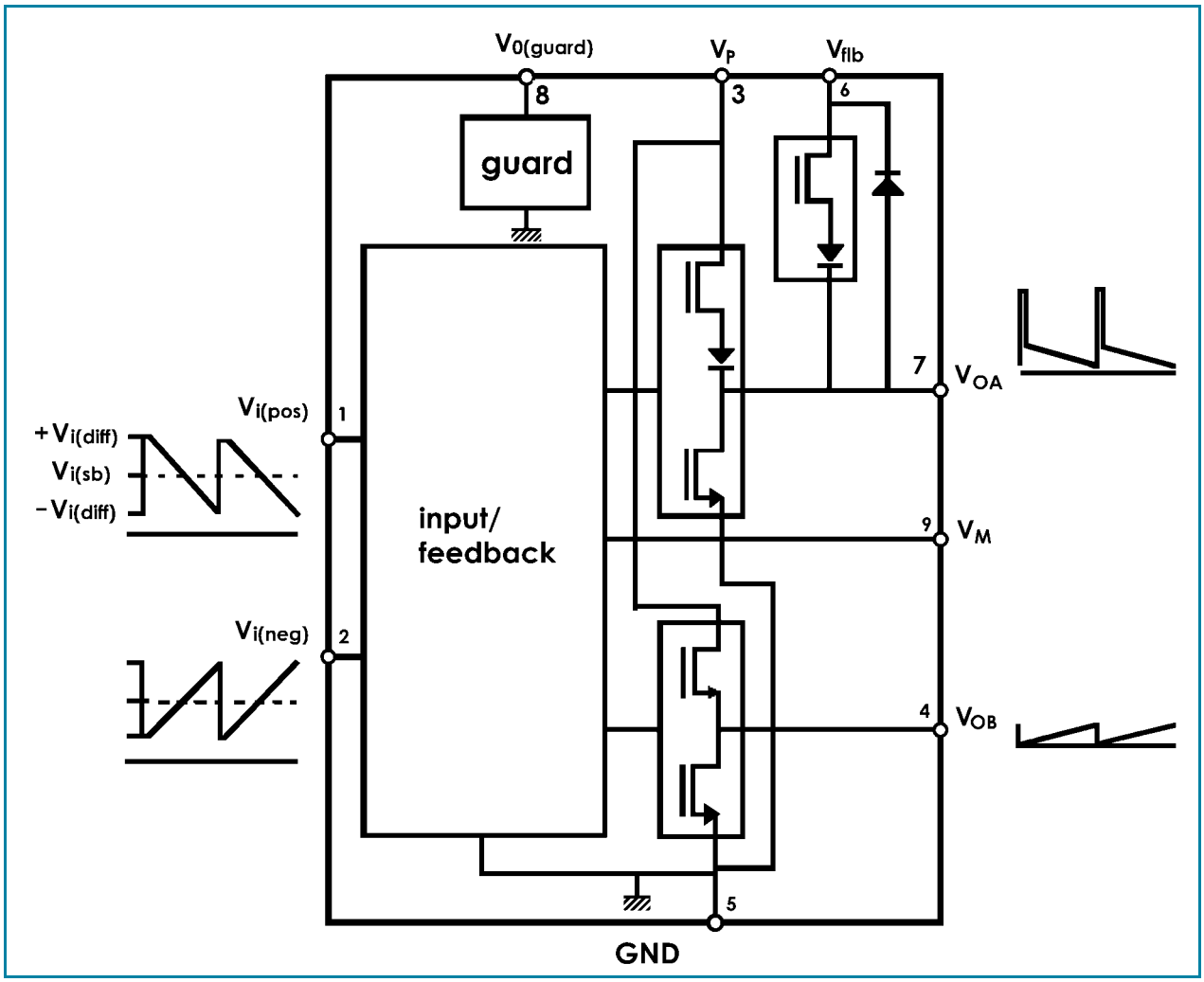
The TDA8357J is a power circuit for use in 90° TV systems for field frequencies of 25 to 200Hz and 16/9 picture tubes. The circuit provides a DC driven vertical deflection output circuit, operating as a highly efficient class G system. Due to the full bridge output circuit the deflection coils can be DC coupled.
The IC is constructed in a Low Voltage DMOS process that combines Bipolar, CMOS and DMOS devices. MOS transistors are used in the output stage because of the absence of second breakdown.

Features :
- Few external components
- Highly efficient fully DC-coupled vertical output bridge circuit
- Short rise and fall time of the vertical flyback switch
- Guard circuit
- Temperature (thermal) protection
- High EMC because of common mode inputs

Pinning

Pin	Symbol	Description
1	Vi(pos)	input voltage (positive)
2	Vi(neg)	input voltage (negative)
3	Vp	supply voltage
4	V_{OB}	output voltage B
5	GND	ground
6	Vflb	flyback supply voltage
7	V_{OA}	output voltage A
8	$V_{O(guard)}$	guard output voltage
9	V_M	input measuring resistor





5. TDA6107Q

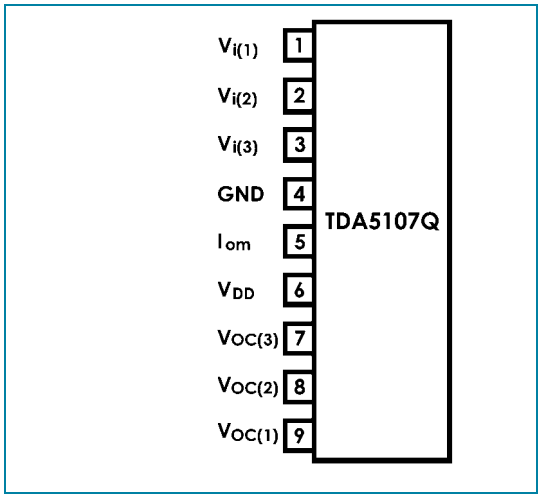
The TDA6107Q includes three video output amplifiers in one plastic DIL-Bent-SIL 9-pin medium power package, using high voltage DMOS technology, and is intended to drive the three cathodes of a colour CRT directly. To obtain maximum performance, the amplifier should be used with black-current control.

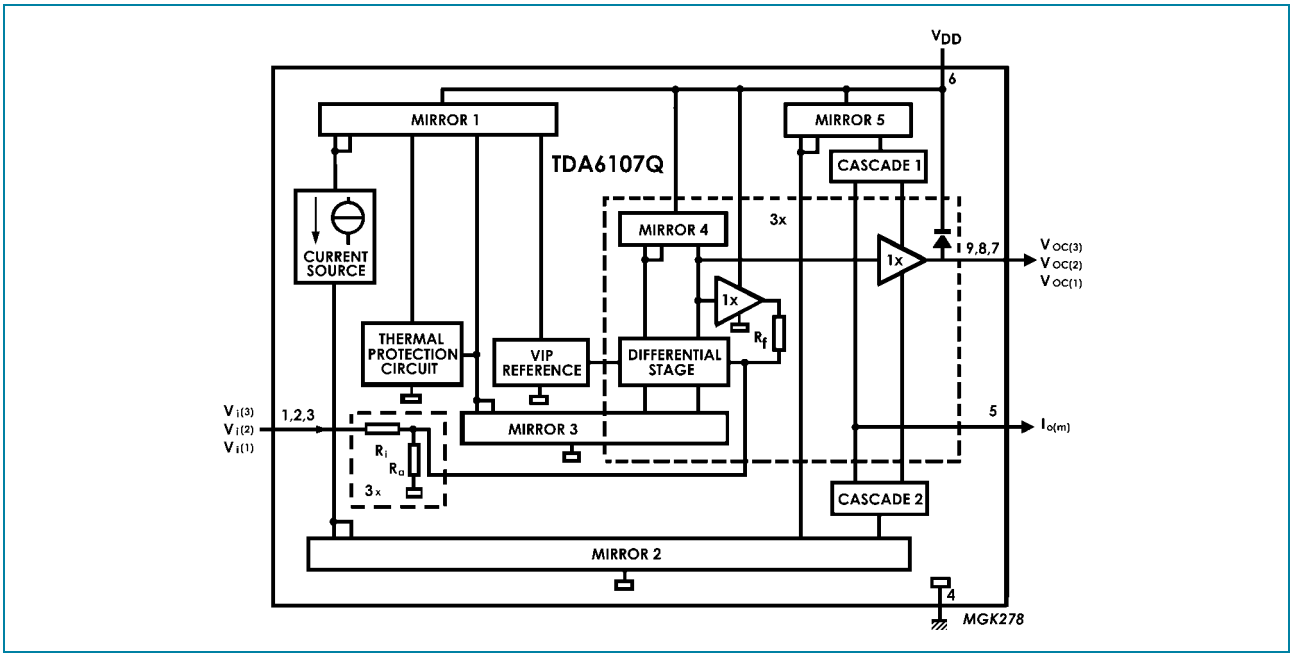
Features

- Typical bandwidth of 5.5 MHz for an output signal of 60 Vpp
- High slew rate of 900V/µs
- No external components required
- Very simple application
- Single supply voltage of 200V
- Internal reference voltage of 2.5 V
- Fixed gain of 50.
- Black-current stabilisation (BCS) circuit
- Thermal protection

Pin description

Pin	Symbol	Description
1	$V_{i(1)}$	inverting input 1
2	$V_{i(2)}$	inverting input 2
3	$V_{i(3)}$	inverting input 3
4	GND	ground (fin)
5	I_{om}	black current measurement output
6	V_{DD}	supply voltage
7	$V_{OC(3)}$	cathode output 3
8	$V_{OC(2)}$	cathode output 2
9	$V_{OC(1)}$	cathode output 1





6. 24C08 8 Kbit EEPROM

features :

- 8 Kbit serial I2C bus EEPROM
- Single supply voltage : 4.5 V to 5.5 V
- 1 Million Erase/Write cycles (minimum)
- 40 year data retention (minimum)

Pin description

Pin No.	Name	Description
1, 2, 3	E0, E1, E2	Device address
5	SDA	Serial Data/Address Input/Output
6	SCL	Serial clock
7	WC	Write control
8	Vcc	Supply voltage
4	Vss	Ground

The memory device is compatible with the I2C memory standard. This is a two wire serial interface that uses a bi-directional data bus and serial clock. The memory carries a built-in 4-bit unique device type identifier code (1010) in accordance with the I2C bus definition.

Serial Clock (SCL)
The SCL input is used to strobe all data in and out of the memory.
Serial Data (SDA)
The SDA pin is bi-directional, and is used to transfer data in or out of the memory

7. STR - F6653

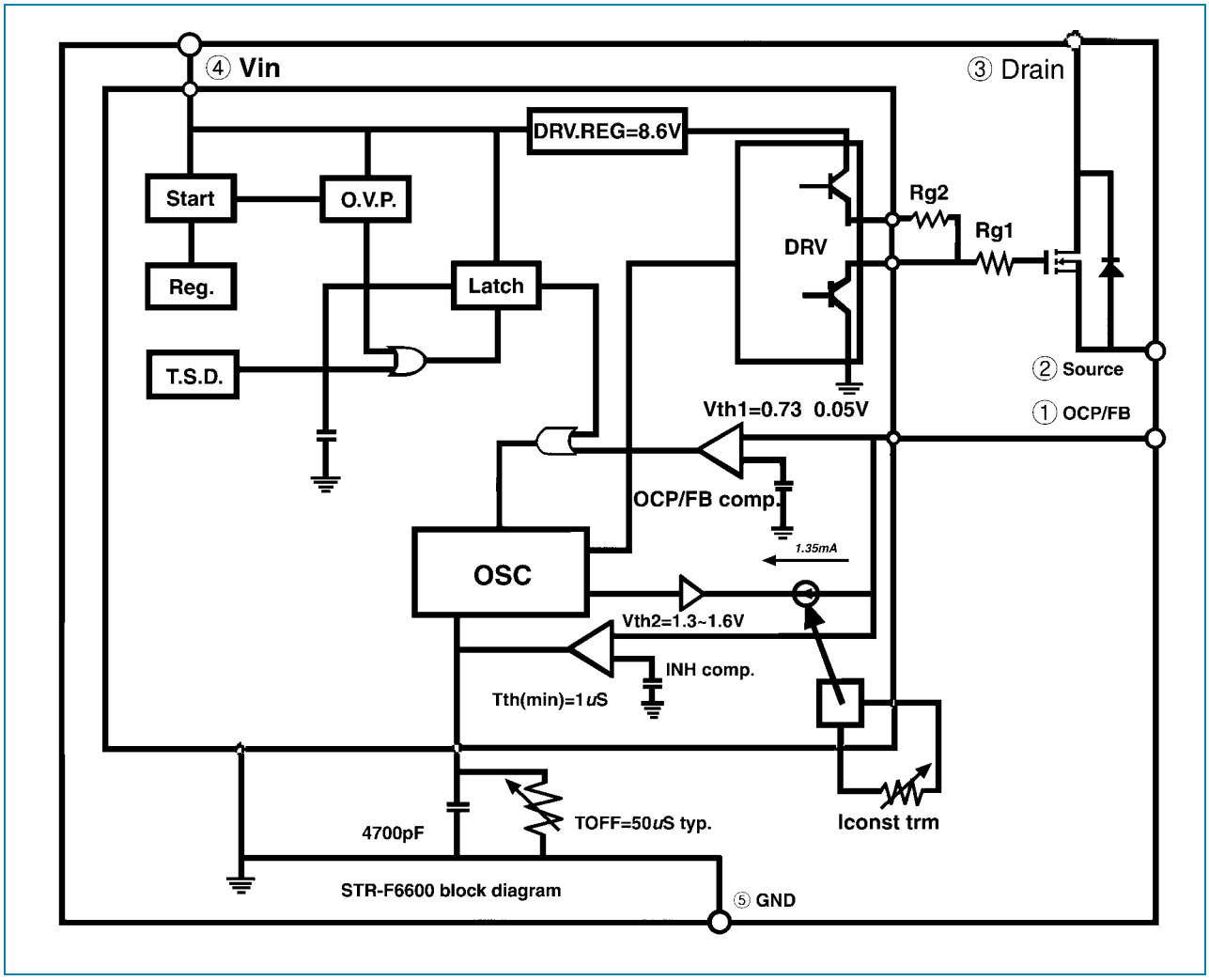
7-1. general description

The STR-F6653 is an hybrid IC with a build-in MOSFET and control IC, designed for flyback converter type switch mode power supply applications.

7-2. features

- Small SIP fully isolated moulded 5 pins package
- Many protection functions :
  - Pulse-by-pulse overcurrent protection (OCP)
  - Overvoltage protection with latch mode (OVP)
  - Thermal protection with latch mode (TSD)

7-3. Block diagram



7-4. pin description

PIN	NAME	SYMBOL	DESCRIPTION
1	Overcurrent feedback	O.C. P/E.B.	Input of over current detection signal and feedback signal
2	Source	S	Mosfet source
3	Drain	D	Mosfet drain
4	Supply	V_{IN}	Input of power supply for control circuit
5	Ground	GND	Ground

7-5. Control part - electrical characteristics

DESCRIPTION	IC PINS NUMBER	SYMBOL	RATING			UNIT
			MIN.	TYPE	MAX	
Operation start voltage	4-5	V_{IN} (on)	14.4	16	17.6	V
Operation stop voltage	4-5	V_{IN} (off)	9	10	111	V
Circuit current in operation	4-5	I_{IN} (on)	-	-	30	mA
Quiescent current in non-operation	4-5	I_{IN} (off)	-	-	100	µA
Maximum off time	-	T_{OFF} (max)	45	-	55	µSEC
Minimum time for input of quasi resonant signals	1-5	T_{TH} (2)	-	-	1.0	µSEC
Minimum off time	-	T_{OFF} (min)	-	-	1.5	µSEC
O.C.P./F.B. terminal threshold voltage 1	1-5	V_{TH} (1)	0.68	0.73	0.78	V
O.C.P./F.B. terminal threshold voltage 2	1-5	V_{TH} (2)	1.3	1.45	1.6	V
O.C.P./F.B. terminal extraction current	1-2	$I_{OCP/FB}$	1.2	1.35	1.5	mA
OVP operation voltage	4-5	V_{IN} (OVP)	20.5	22.5	24.5	V
Latch circuit sustaining voltage	4-5	I_{IN} (H)	-	-	400	µA
Latch circuit release voltage	4-5	V_{IN} (Loff)	6.6	-	8.4	V
Thermal shutdown operating temperature	-	T_j (TSD)	140	-	-	^{0}C

7-6. MOSFET electrical characteristics

DESCRIPTION	IC PINS NUMBER	SYMBOL	RATING			UNIT
			MIN.	TYPE	MAX	
Drain-to-source break down voltage	3-2	V_{DSS}	650	-	-	V
Drain leakage current	3-2	I_{DSS}	-	-	300	µA
On-resistance	3-2	R_{DS} (on)	-	-	1.95	W
Switching time	3-2	tf	-	-	250	noec
Thermal resistance	-	O_{CH} - F	-	-	0.95	^{0}C/W

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